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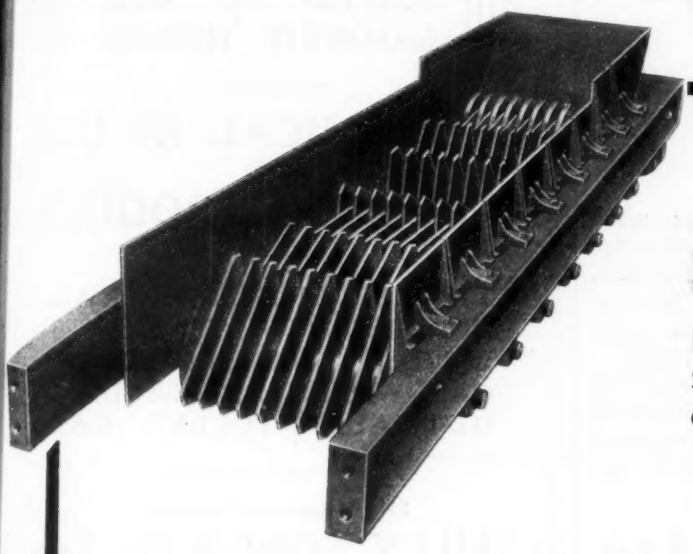

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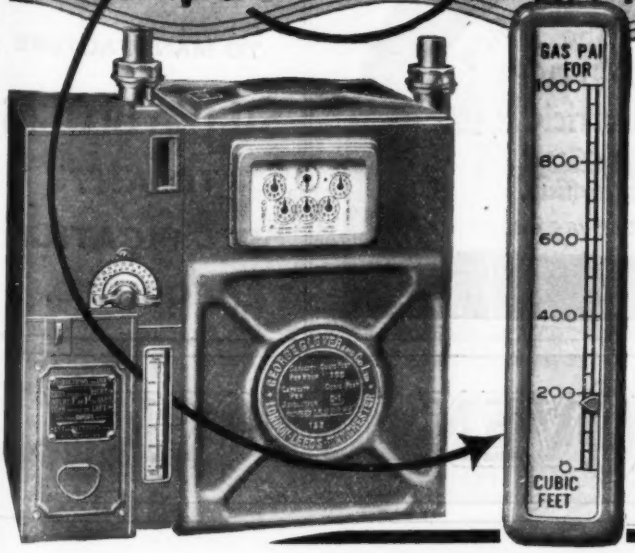

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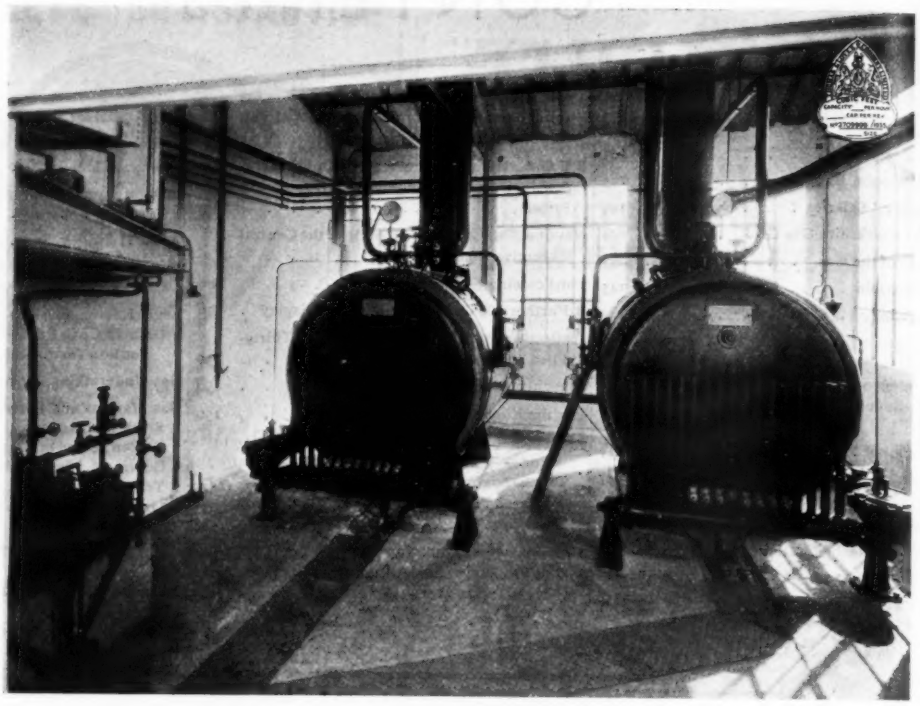

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Gas Journal

APRIL 17, 1935

Vol. 210. 87th Year No. 3752.

Editorial Notes

A B.G.F. Report

ANOTHER step forward in the development of the British Gas Federation is indicated by the publication of a first Press Report, which appears elsewhere in this issue and announces the names of the members of Council nominated by the five constituent bodies.

Our first reaction to the list was, we must confess, one of slight disappointment; not, let us hasten to add, at any sins of commission, but rather at the absence of anything whatever in the nature of a surprise. It is hard to say why we should have expected any surprise elections, and indeed it needs but a glance to appreciate the soundness and strength of the Council. On the other hand, it is entirely of here-we-are-again character, composed of men who have already been meeting one another in every conceivable committee and council, and who must know one another's views on every possible subject, and we should have been quite prepared to welcome a few " shocks " in connection with this new Federation of existing national bodies.

Perhaps, however, we have been thinking too fast, because it is obviously necessary to establish the new organization on essentially sound foundations, and we have such faith in its potentialities that we would not have it rush to a fall. And in any case it is clear from their records and public utterances that among them the members in varying degrees possess all the virtues, from solidity and conservatism to almost the crusading spirit. It is not too much to hope that the new circumstances, in which every section of the Industry will meet together in common council, will supply the background for the foundation and advancement of policies which will carry gas service forward with giant strides. And so, with the whole Gas Industry, we wish the new Council every success in its work, trusting that it will not dwell unduly on the boons we have conferred on mankind in the past century and more, or on the blessings we are conferring to-day, but envisage the kind of Gas Age of which one of its members recently drew such a striking word-picture in a speech at Manchester, and the bringing of " energy to all and new life to the countryside " to which the electrical industry is so ardently educating the public.

It's Quite Simple, But!

AT a meeting of the Midland Section of the Coke Oven Managers' Association on April 5 Dr. Sinnatt, Director of Fuel Research, presented a Paper by himself and Dr. King on the subject of hydrogenation—or, rather, hydrogenation-cracking to produce oils of low boiling point from tars and high-boiling oils. Besides indicating the wide field which is open to the hydrogenation process, the Paper shows strikingly what a relatively simple matter it is to produce first-class motor spirit from tar and tar oils. As we mentioned a few weeks ago, if a yield of 50% of motor spirit were obtained from the tar produced by the gas and coke oven undertakings of England and Wales it would be equivalent to about 150 million gallons of motor spirit.

While commercially we cannot for the moment get a move on in this matter of hydrogenation, the technique of the process is being simplified. The Gas Light and Coke Company, as exemplified by the contribution by Hollings, Bruce, and Griffith which we published in the " JOURNAL " for Feb. 20 last, is carrying out much valuable investigational work on the subject, and the research at the Fuel Research Station is common knowledge, though its worth is perhaps insufficiently appreciated. It has been shown that low-temperature tar can be treated in the vapour-phase process without preliminary treatment or even filtration to remove solid impurities; it is not even necessary to dehydrate the tar. At the present stage of hydrogenation technique, as explained by Dr. Sinnatt at the meeting to which we have referred, it is not possible to deal with high-temperature tar in one stage, but it has already been shown that a crude tar which yields 35% of distillate in the normal way will give 60% of distillate when distilled with hydrogen under pressure, and that the nature of the heavy residue is altered. We called attention to this matter in the " JOURNAL " for Feb. 13, when we suggested that in this direction lie possibilities of improving the market for pitch. And as for creosote, in one passage over the catalyst in the vapour-phase process 72% by volume of the creosote is converted to spirit, and if the remaining oil is recycled a total yield of 106 volumes of spirit is obtained per 100 volumes of creosote.

If all the creosote produced to-day were converted by the Gas Industry into the same volume of motor spirit it would be certain of a ready sale, since it would represent only about 6% of the motor spirit annually consumed in this country. But this 6% would mean a great deal to the Gas Industry. Bearing this in mind, the question will inevitably be asked, Why is the Gas Industry doing nothing about it on a commercial scale? Well, we have a shrewd suspicion that the cloud on the horizon is the patent situation. But in view of the great national importance of this single phase of the Gas Industry's possibilities, *it is surely not too much to hope that the whole question will be fully considered in high quarters.* The Gas Industry is one of the chief national assets, and its just claims for consideration ought not to be ignored.

While we are being held up, we may or may not find consolation in the fact, as mentioned in these columns on Feb. 27, that the first hydrogenation unit of the Billingham plant of Imperial Chemical Industries had been brought successfully into operation—engaged in converting coal tar creosote into petrol.

Gas Engineers' Salaries

One day last week we were reading a report from a provincial correspondent of a Town Council meeting at which the salary of the gas engineer was discussed. The speeches revealed clearly that he had made a success of his job, and that the consumers were enjoying remarkably cheap gas; these facts were not disputed. His salary was revealed as being more than 20% below that paid in four comparable neighbouring undertakings, and, after a lengthy discussion, he was granted a small rise by an exceedingly slender majority of the Council. Being a man for whose enterprise and ability we have considerable esteem, we mentally wished him another rise at a very early date, and temporarily dismissed the matter from mind.

On the very next day we were in conversation with a man of considerable eminence in the business world, who has dealings with many other industries besides our own. "Your gas engineers," he said, "on the whole are a slow lot; you don't pay them enough." Which naturally brought us back very forcibly to our Town Council report.

In a matter of this kind we imagine that gas engineers would be considered prejudiced persons, and we should certainly expect them to disagree with the first part of our friend's statement, but to agree heartily with the second. Perhaps we ourselves might be dubbed prejudiced also, but fortunately in this case we have no inkling whatever of the party politics of the various speakers and voters at the meeting, so that we can freely express the view which we have so often expressed before that it is most amazingly short-sighted of any municipality, or company either for that matter, to endeavour to obtain engineering or administrative skill for a gas undertaking at economy rates. Whether or not the best rates paid for this kind of service to the community are justified is not within our province to discuss, but, unless and until the whole social organization is altered, the municipality or company which does not pay enough to secure an efficient and satisfied engineer and manager for its gas undertaking is guilty of breach of faith to its ratepayers or shareholders, and in each case above all to its consumers. At the Council meeting quoted above a member actually asked for an assurance that the engineer's rise would not increase the price of gas to the consumer—in an undertaking of over 400 millions a year! The most certain way, surely, of hurting the consumer is to refuse to pay enough to secure the very best available man, or to employ a man who is half-hearted because he is underpaid.

An argument which is raised on occasion is that good men are obtainable at figures below what is ordinarily considered the standard. So, too, is plenty of sweated labour for those who wish to employ it, but this does not morally justify its employment, as was pointed out by the Secretary of The Institution in correspondence published in our columns not long since. We mention this aspect merely in passing, because we still prefer to rely on the main argument of hard-headed business sense. Fortunately in these days the gas engineer has at any rate the moral backing of his Chartered Institution in matters of this kind, and the case in question, coupled with our business friend's sweeping and quite gratuitous statement, leads us to think that its constant vigilance is well justified.

Proposed Lanarkshire Gas Grid

During the course of the meeting of the North British Association of Gas Managers an Address on the proposed Lanarkshire Gas Grid was given by Dr. Wylam, H.M. Alkali Works Inspector, who is advising Sir Arthur Rose, the Commissioner of the Distressed Areas in Scotland. The idea is to investigate the possibility of a gas grid in Lanarkshire and Renfrewshire to absorb coke oven gas which will be available shortly from coke plant to be erected, and a private interim report has already been issued to the gas undertakings likely to be affected by such a scheme. The grid, it should be made clear, is simply an offshoot of a comprehensive plan to build-up Scottish industry, and has nothing whatever to do with the linking-up of gas undertakings or with their re-capitalization.

On more than one occasion in recent years we have expressed the opinion that, where possible, coke ovens should be linked with blast furnaces and steel works, that in this way the nation will reap the greatest economic advantage. Lately a number of co-ordinated schemes have been worked out and put into operation, outstanding examples being the Normanby Park Steelworks at Scunthorpe, Richard Thomas & Co., also at Scunthorpe, Thos. Firth and John Brown, Ltd., at Sheffield, the Consett Iron Company at Durham, and the United Steel Companies, Ltd. At Normanby Park, which is a compound works, blast furnaces are in operation and blast furnace gas is available for heating the new coke oven battery—at present, we believe, the only battery of ovens fired by blast furnace gas in this country. By this means sufficient extra coke oven gas is released to enable the steel furnaces to be fired with a mixture of blast furnace and coke oven gases. Last year Major Koopman, Chief Fuel Engineer to the United Steel Companies, explained at a meeting of the Institute of Fuel that while it is economical under the conditions prevailing at Normanby Park to utilize all the coke oven gas in the works, as there is no means of disposal outside, yet the gas burned under the boilers could be replaced by an inferior fuel. Probably, if the plant was working at full capacity, he said, there would be sufficient blast furnace gas available for the purpose, and he concluded that this would leave an annual surplus of something like 1,000 million cu.ft. of coke oven gas for disposal.

Availability of the Gas

MAJOR KOOPMAN'S analysis of the working at Normanby Park led him to the suggestion that the Cleveland area presented possibilities for the setting up of a gas grid. This is an important iron and steel manufacturing district, and the suggestion that a grid should be established there has been put forward on several occasions. Now in his conclusion Major Koopman pre-supposed that a large quantity of surplus gas would be available, basing his supposition on the figures relating to Normanby Park. At Normanby, however, very lean Lincolnshire ores are being smelted and the coke consumption is from 20 to 25% above the consumption in other parts of the country with equally good practice but using different ores. A 25% reduction of the hourly output of coke oven gas at these works would practically eliminate the balance of coke oven gas which is used on the boilers at Normanby Park, and which it was suggested could be distributed as surplus. This line of argument appears to eliminate the Cleveland district as one in which a coke oven gas grid could economically be established in connection with iron and steel manufacture; and we conclude that if the wise policy is followed in Cleveland of erecting coking plant next to the blast furnaces, on the lines followed at Normanby Park, with reasonably good coking practice there will be little or no surplus coke oven gas available for outside distribution.

We revert to the suggestions of a grid in Cleveland because it has much point in connection with the proposed grid in Lanarkshire. Every case for the purchase of coke oven gas by gas undertakings should be surveyed on its own merits. The very term "grid" seems to excite the layman's imagination. A grid is not necessarily a means towards supplying the public with cheaper gas. It can only serve this useful purpose when the particular conditions affecting the area of supply are favourable. At the same time, any narrow prejudice on the part of the Gas Industry must not be allowed to interfere with the solution of supplying the public with cheaper gas. And if, after full consideration of the Lanarkshire proposals, a case is made out for the purchase of surplus coke oven gas, not forgetting the obligations of the Industry in supplying gas, the Scottish undertakings concerned should buy.

We have no doubt whatever that the scheme, especially bearing in mind its national significance, will receive the most sympathetic consideration of the Industry in Scotland. At the same time we must urge that the Industry, having given such consideration to the proposals on their own merits, take every possible step to ensure that full weight is given to their views, which, after all, must obviously be of outstanding value in such a matter.

National Benzole

THE Gas Industry is a Products Industry. It sells heat on the grand scale—heat without smoke in the form of gas and coke. It also sells tar—tar for roads and tar for fractionating into a host of other products, including benzole. The Industry also recovers benzole direct from the gas. Recent years have witnessed rapid growth in benzole recovery, and greater quantities should be produced in the future, to the benefit of gas undertaking and gas consumer. The Industry ought to feel proud of its services, and anxious to tell the world at large what it is doing and of what it is capable given greater support. As a fact, however—and it is a curious fact—the Industry seems more anxious to observe the dignity of silence. If the Gas Industry was of recent origin and had no tradition, the picture, we suggest, would be entirely altered. The new Gas Industry would be amazed at what it accomplishes and what it could accomplish; and it would tell people all about it.

The way the Gas Industry is selling benzole is typical of what we mean. Last week we made a very obvious but necessary suggestion that all gas undertakings and coke ovens should use benzole for their motor transport, and that all individuals having cars and who earn their livelihoods by the Gas Industry or the Coke Oven Industry should, believing in the industries' products, be enthusiastic users of benzole *and recommend it*. More than this can be done, however. What about all the stockholders in the Gas Industry? Is every stockholder adding to the value of his investment by using benzole instead of petrol? Have the advantages to himself, the Industry, and the Nation been pointed out to him? And what applies to company-owned undertakings applies equally to those municipally-owned, for every ratepayer has something to gain by using benzole.

Further than this, there are 10,000,000 and more consumers of gas. Not all these are potential benzole consumers, but a vast number must be. Surely here lies scope for propaganda. The product is right, and a greater demand for it could be created very easily indeed. We hope that in their own interests gas undertakings will become "benzole-minded" and see that their consumers share this view.

Street Lighting

MANY points of the greatest importance in connection with street lighting are brought forward and discussed in a Paper which Mr. Masterman read to the North-Western Branch of the Illuminating Engineering Society last week and which is reproduced in our issue to-day. His main theme is the proper use of the B.S.I. Street Lighting Specification, which, like any other specification, can be a good servant but a bad master. At present there can be no doubt that its proper application is handicapped by the fact that there are far too few engineers who have made a special study of the art, science, and economics of street lighting. Good street lighting, which involves highly technical considerations, demands technical competence of those planning installations. The specification in whatever form it may assume must be regarded not as an end in itself but as a guide to the provision and maintenance of satisfactory street lighting.

Of course, at the present time, the electrical interests are concentrating their attention on a single factor. They are suggesting that road brightness is *the* criterion of satisfactory illumination to meet modern conditions. Now the Gas Industry fully appreciates the importance of road brightness, but it is only one of several phases of the question which have to be considered. The view that road brightness should be the one criterion of good lighting cannot be accepted. In the first place, no one has been able to specify how this can be satisfactorily measured, taking into consideration the varying aspect of the road with change of viewpoint, and the type, material, and conditions of the road surface. Again, reflecting properties of a road surface completely change with varying degrees of wetness. Also, such a criterion, as we have pointed out before, does not sufficiently take into account the highly important factor that only in a proportion of cases does road surface represent the background against which objects are seen. The surfaces of footways, buildings, and so on, and other traffic so very often form the background against which objects are seen, and exclusive concentration on road surface brightness would lead to these other important surfaces being neglected from the illumination point of view.

Moreover, false deductions can all too readily be

drawn by solely considering the visibility of objects ahead on flat, straight roads. Objects are lost in dark spots where the road forms no background, as at bends, and one cannot neglect the sudden unmasking of objects by moving traffic. As Mr. Masterman remarks, the problem of street lighting is dynamic rather than static, and the merits of an installation cannot fairly be judged by stationary viewing, since this tends unduly to favour the importance of uniform brightness even though it be of a very low order. The first requirement in adequate lighting is the provision of sufficient total luminous flux, and average illumination is at least as important as minimum illumination.

A highly interesting part of Mr. Masterman's Paper is that dealing with the relationship between lighting and road accidents. Analysis of the report of the Ministry of Transport on fatal road accidents in 1933 leads him to the conclusion that in built-up areas there is 35% more probability of an accident in the dark winter hours before dusk and after dawn compared with the corresponding summer daylight after dark and before dawn. In areas not built-up and where presumably there is no street lighting this probability is increased to about 80%. "I conclude from this," says Mr. Masterman, "a very definite relation between street accidents and street lighting, and it would seem that the provision of some form of lighting on the average decreases the probability of accident by about one-half, but there is clearly some way to go in the provision of better lighting to reduce the probability of accident still further. The recent introduction of a speed limit in built-up areas perhaps decreases the need for the most brilliant form of lighting, but a sufficiency should be provided on roads carrying any considerable degree of traffic to encourage the driver to travel without headlights." The Gas Industry is responsible for about 70% of the street lamps in Great Britain, so that it has great opportunity in the better lighting which is due.

Correspondence

Benzole Refining

SIR,—On looking through the issue of your "JOURNAL" for April 3 my attention was attracted by the title of an article, "A New Method for Refining Benzole and Hydrocarbons." At last, I thought, a new and wonderful reagent has been discovered that has solved the major problem of benzole refining. I was surprised to find, however, that although the authors had gone into considerable detail as to its effects, they had forgotten to mention the nature of this marvellous reagent.

It removes initial colour with a loss apparently of only 2%, it removes 0·083% W/V of sulphur with the same loss, it only attacks the highest boiling fractions (where incidentally most of the unsaturateds exist in tar benzoles), and can be used in various strengths designated by arbitrary numbers, each strength giving a specific effect and loss. In fact, it does exactly the same things as our old friend sulphuric acid. Alas, this "elixir" of benzole refining was not so wonderful after all, and the benzole industry has not learnt anything it did not know.

No doubt, however, the numerous investigators who have been working on the problem of gum formation for many years will be delighted to hear that the action of inhibitors has been settled by a few experiments with filter funnels and is so simple after all. I can assure the authors that their conclusion that the action of an inhibitor is not that generally accepted—namely, to retard or prevent oxidation and gum formation, but to render non-volatile gums volatile—is not justified by the facts reported, which are capable of quite simple explanations. Alas, even the dream that the addition of an inhibitor to a motor fuel that *already* contains gum can render it fit for use by volatilizing the gum seems still but a dream.

Yours, &c.,
W. H. HOFFERT.

Research Laboratory,
National Benzole Company, Ltd., April 9, 1935.

SIR,—Communications in which Mr. Nielsen has a part have a way of being interesting, and the article in your issue of April 3 has, even in its incomplete state, some points for discussion.

The general problem of benzole refining, particularly of crude spirits derived from other than high-temperature carbonizing with maximum cracking, is to procure stability and a satisfactory sulphur content with a minimum volume loss due to the destruction of unsaturated hydrocarbons. I am assuming, of course, that we wish to keep within the framework of the National Benzole Association specifications. It is doubtful if any ordinary refining process using sulphuric acid has a specific advantage of attacking sulphur compounds and giving stability without the proportionate loss of hydrocarbons. I do not find in the figures of Hahn and Nielsen any assurance that a specificity exists in the case of their reagent in this sense.

It is difficult to be sure of this, because the sample of benzole on which they have worked is far from typical. Being a tar benzole, it is deficient in "pre-benzole" compounds. This may not be important in regard to its CS_2 content, as we can consider that CS_2 now offers no particular problem, except the small cost of its elimination. The light hydrocarbons, however, which appear along with it, and are largely missing in the sample examined, have a considerable importance in the chemistry of the refining process, and the conclusions reached are weakened.

It may be noted, further, that in Table III. it is found that a satisfactory stability is reached, although the reagent has only succeeded in reducing the sulphur figure by about 20%. What result would we have had to record had the sulphur been, say, 0·6% in the virtual absence of CS_2?

It is to be hoped that the authors will have some information for us on the question of attack on the two different classes of sulphur compounds ordinarily present, and on mercaptan sulphur.

In Table II. the authors show a specific limit of reaction for each strength of reagent. I do not recollect seeing as careful an estimate made for the action of sulphuric acid on crude benzoles, but have an impression that it might reveal something similar, but not perhaps as flat a curve. We have already recognized that certain strengths of acid may suit our specific sample of benzole best, and proceed accordingly. The full test on the same lines would be well worth making.

The observations on the reversal of the change of specific gravity are very intriguing. A change of 0·004 in the specific gravity is large. It might, for example, result from a reduction in CS_2 content by about 1%, except for the fact that this quantity does not seem to be present. Alternatively, it might result from the elimination of 10% of hydrocarbons of gravity 0·886 or thereabouts. Note also that if the calculation is complicated by the necessity of allowing for the destruction of hydrocarbons of gravity below 0·846, the proportion of material destroyed of gravity over 0·846 must be so much the greater.

Of course, if Messrs. Hahn and Nielsen are adding to the crude in their refining reaction, speculations on the change in question are of little use.

I find it a little difficult to follow the authors in their last observations, and more information is clearly called for. If it is a question as to whether pyrogallol and the gums form an azeotropic mixture, this is a matter for actual determination. What surprises me is that if the oxidation product is once volatile in the dish, why should it not be proportionately volatile under the conditions of the funnel? I am sure that the originators of the inhibitor process can give us some exact facts on this point.

The above remarks, I find, on re-reading, suggest that I have been seeking for objections to the conclusions of Messrs. Hahn and Nielsen, but I would ask that this impression be considered a wrong one. I hope, and I am sure all interested in the subject will support the request, that the full information will be made available as soon as conveniently possible. Nobody has any support to give to acid refining processes if a process offering specific advantages in percentage yield with good effect on sulphur content and stability is available.

We also await the information on gums in gas with the greatest of interest. The point raised above, as to the absence of the lightest hydrocarbons from the benzole sample examined by the authors, will have occurred to many readers, in this connection. Experiment points to these particular unsaturated bodies as playing perhaps the most important part in vapour-phase gum formation.

Yours, &c.,
CHARLES COOPER.
W. C. Holmes & Co., Ltd.

Huddersfield,
April 13, 1935.

Personal

Retirement of Mr. H. E. Ibbs.

We learn from the *Co-Partners' Magazine* that the Chief Accountant of the Gas Light and Coke Company, Mr. H. E. IBBS, retired at the end of March.

The whole of Mr. Ibbs' business life has been spent with the Company. He entered its service as a Junior Staff Clerk in the Accountant's Department in 1889, and has been connected with that Department ever since. He came into prominence when acting as Secretary to a Committee formed in 1911 to confer with the Income-Tax Authorities on the question of wear and tear allowances to be made to the Gas Industry. In 1915 during the Great War—a very critical period in the Company's history—he became Accountant, and also in that year succeeded Mr. Orford as Editor of that well-known work, "Field's Analysis."

At the termination of the war Mr. Ibbs took a leading part in launching a number of co-operative schemes for the sale of tar to distillers, and was of great assistance in the formation and working in its earlier days of the National Gas Council and, in conjunction with that Council, in helping to steer through Parliament the Gas Undertakings Acts of 1920-34.

In 1924 the Directors recognized Mr. Ibbs' outstanding abilities by conferring upon him the title of Chief Accountant of the Company. The Directors, in view of his special knowledge of the affairs both of the Company and of the Gas Industry, have appointed him "Consultant Accountant," and it is understood that his services will be retained also in connection with the affairs of the South-Eastern Gas Corporation, Ltd.

Messrs. S. H. COLLINS and P. F. SCARTH have been appointed Joint Accountants to succeed Mr. Ibbs. They entered the Company's service in 1899 and 1898 respectively, and were appointed Joint Assistants to the Chief Accountant in 1928. Mr. Collins will deal more especially with the financial, and Mr. Scarth with the technical, work of the Department.

* * *

We learn that Mr. HENRY FRANK HARDING JONES has been elected to a seat on the Board of the United Kingdom Gas Corporation.

* * *

M. ROLLAND D'ESTAPE, for many years President of the Syndicat Professionel de l'Industrie du Gaz en France, has recently been appointed an Officer of the French Legion of Honour.

* * *

Mr. H. BURNET, B.Sc., of Preston, has been appointed chief Engineering Assistant to the Blackpool Corporation Gas Department. He is 37 years of age and has been Technical Engineering Assistant to the Preston Gas Company.

Obituary

The death has taken place of Mr. ROBERT AITKEN, who for many years was a Director of the Montrose Gas Company, Ltd.

* * *

Mr. WILLIAM HAMBY, well known in Sheffield business circles, has died at his Sheffield home at the age of 81. He was for over 43 years in the service of the Sheffield Gas Company, 17 years of which he was Secretary.

* * *

We regret to announce the death of Mr. SAKURA OKAMOTO, Vice-President of the Tokio Gas Company, Ltd. He was well known to a number of British gas engineers, having been elected a member of The Institution of Gas Engineers in its Jubilee Year, 1913, during the Presidency of the late Mr. Edward Allen, of Liverpool. Owing to his many responsibilities he had not been able to visit England during recent years. By his passing the Gas Industry of Japan has suffered the loss of an eminent technician and an able administrator.

The Sixth International Congress for Scientific Management is to be held in London from July 15 to 20 under the patronage of H.R.H. the Prince of Wales. The Chairman, Sir George Beharrell, on behalf of the Council, extends a cordial invitation to all those interested in any phase of management. Applications for programmes and membership forms should be made early to the Secretary of the Congress at 21, Tothill Street, S.W. 1.

The British Gas Federation

First Council Meeting

The first meeting of the Council of the British Gas Federation was held at 28, Grosvenor Gardens, London, S.W. 1, on Wednesday, April 10, 1935, at 10.30 a.m.

The following nominations of Members of the Council by the five Constituent Bodies were reported—viz.,

Members of the Council Nominated by the Constituent Bodies Under Rule VI. of the Constitution.

The Institution of Gas Engineers.

Mr. C. VALON BENNETT, President of the Institution of Gas Engineers.
Col. W. MONCRIEFF CARR, O.B E., T.D., M.Inst.Gas E , Vice-President of the Institution of Gas Engineers.
Mr. H. D. MADDEN, M.Inst.C.E., Engineer and Manager of the Cardiff Gas Light and Coke Company.
Mr. H. C. SMITH, M.Inst.C.E., Chief Engineer of the Tottenham and District Gas Company.
Mr. F. P. TARRATT, M.Inst.C.E., Engineer of the Newcastle-upon-Tyne and Gateshead Gas Company.

The Gas Companies' Protection Association.

Mr. R. W. EDWARDS, Chairman of Committee.
Mr. F. J. BRADFIELD, F.C.I.S., General Manager and Secretary of the Commercial Gas Company.
Mr. CHAS. F. BOTLEY, M.Inst.C.E., Engineer and General Manager of the Hastings and St. Leonards Gas Company.
Mr. R. HALKETT, General Manager and Secretary of the Sheffield Gas Company.
Mr. F. G. BREWER, Secretary of the South Metropolitan Gas Company.

The Society of British Gas Industries.

Mr. D. W. TURNER, Chairman of the Council of the Society of British Gas Industries.
Mr. D. M. HENSHAW, M.Inst.Gas E., Vice-Chairman of the Council of the Society of British Gas Industries.
Mr. F. J. GOULD, Hon. Secretary of the Society of British Gas Industries.
Dr. E. W. SMITH, C.B.E., F.I.C., Hon. Treasurer of the Society of British Gas Industries.
Mr. H. M. THORNTON, J P., A.M Inst.C.E., M.I.Mech.E., M.Inst.Gas E., Member of the Council of the Society of British Gas Industries.

British Commercial Gas Association.

Councillor WALTER MUTER, President of the British Commercial Gas Association.
Sir FRANCIS GOODENOUGH, C.B.E., Executive Chairman of the British Commercial Gas Association.
Mr. J. JAMIESON, Engineer and Manager of the Edinburgh Corporation Gas Department.
Mr. J. SANDON STUBBS, Secretary and Treasurer of the Liverpool Gas Company.
Mr. W. N. WESTLAKE, Engineer and General Manager of the Exeter Gaslight and Coke Company.

National Gas Council.

Sir DAVID MILNE-WATSON, LL.D., D.L., President of the National Gas Council.
Mr. WM. CASH, F.C.A., J.P., Vice-Chairman of the Central Executive Board.
Mr. T. P. RIDLEY, F.C.I.S., Commercial Manager and Secretary of the Newcastle-on-Tyne and Gateshead Gas Company.
Mr. C. S. SHAPLEY, M.I.Mech.E., Engineer and General Manager of the City of Leeds Gas Department.
Mr. A. W. SMITH, F.C.I.S., General Manager and Secretary of the Birmingham Corporation Gas Department.

Sir David Milne-Watson, LL.D., D.L., was unanimously appointed Chairman of the Council.

Date and Time of Annual General Meeting.—It was provisionally decided that the First Annual Meeting should be held on Monday, Nov. 4, 1935, at 3 p.m. It is proposed at this meeting to invite Members of the Constituent Bodies to bring forward any views they may have as to policy and direction of the Industry.

Date of Second Annual Dinner.—It was provisionally decided that the Second Annual Dinner should be held on the evening of the same day as the Annual Meeting, namely, Monday, Nov. 4, 1935.

Exhibitions Committee.—A Report of the Exhibitions Committee was submitted and considered, and certain decisions reached.

British Industries Fair, Birmingham, 1935.—It was reported that the Fair Management Committee had very kindly extended an invitation to the British Gas Federation to be their guests at Luncheon at the British Industries Fair on Wednesday, May 22. On this occasion Sir David Milne-Watson would be the chief guest and would respond to the Toast of the Industry.

It was hoped that as many representatives of the Gas Industry as possible would accept this invitation.

Their Majesties' Silver Jubilee.—It was unanimously decided that the loyal good wishes of the Gas Industry should be sent to Their Majesties, The King and Queen, on the occasion of their Silver Jubilee.

The functions and scope of the work to be undertaken by the British Gas Federation were discussed at length.

News in Brief

A Gas Undertaking in the Midlands, selling over 1,000 million cu.ft. of gas per annum, advertises to-day for an Assistant Distribution Superintendent.

An Address was Delivered to the Blackburn Rotary Club on April 11 by Mr. J. D. Ashworth, Engineer and Manager of the Blackburn Gas Department.

Both the Lighting and Heating of the new houses to be erected at Captain's Park, Preston Road, Linlithgow, are to be done by the Linlithgow Gas Company, Ltd.

Applications are Invited by the Haverfordwest Corporation Gas Department for the position of Manager. The post carries a salary of £275 per annum, with a bonus on gas sales.

An Interim Dividend at the rate of 3½%, free of income-tax, on account of the year ending June 30 next is to be paid on May 31 by the Directors of the Oriental Gas Company, Ltd.

To Popularize Gas the Manchester Gas Department have organized a series of demonstrations and lectures on cooking and washing in the Lansdowne Park Methodist Schools, Lansdowne Road, Crumpsall.

Joint Gas Undertakings, Ltd., Dugdale Street, Nuneaton, have recently increased their capital to £60,000 by the addition of £59,000 in 29,000 ordinary and 30,000 4½% cumulative preference shares of £1.

Among the Objects of a Special Order for which the Wandsworth and District Gas Company intend to apply to the Board of Trade is the provision for the transfer to and vesting in the Company of the Undertaking of the Leatherhead Gas and Lighting Company.

A Reduction in the Price of Gas has been approved by the Leigh (Lancs.) Gas Committee for power and manufacturing purposes from 1s. 10d. to 1s. 6d. per 1,000 cu.ft. subject to the usual discount for prompt payment of 3d. per 1,000 cu.ft., making the price 1s. 3d. net.

A Record Price for the Weymouth Consumers' Gas Company's £100 stock was a feature of a sale conducted at Westham last week. Biddings for this 6% stock went up in jumps to £135 and from that figure bids of single pounds and less took it to £170, which breaks every record in the Company's history. The yield at this rate is equivalent to about 3½% on the purchase price.

The Price of Coal is to be Increased to all public utility undertakings in the West of Scotland as the result of a decision by the Lanarkshire Coalowners' Association. It has been agreed to increase the price of small coal by 1s. a ton and round coal by 6d. a ton to all gas, electricity, and transport undertakings. Glasgow Gas Department alone will pay £20,000 a year extra. The Gas Department will be in the market for coal in mid-summer. Last year they had also to pay higher prices for supplies. The annual consumption of the gas undertakings, which is the biggest consumer in Scotland, is 549,999 tons.

Gas Retained at Stratford-on-Avon.—The town of Stratford-on-Avon is at present lighted by gas, but recently the S.W.S. Electric Power Company asked permission to give a demonstration of lighting by electricity in High Street, and offered to submit a tender for lighting the whole town. The Sanitary and Highways Committee decided not to agree to a further demonstration, and to request the electricity company to remove their demonstration lamps as soon as possible. At the Council meeting last week it was suggested that the Gas Department should be allowed to show what it could do in giving improved street lighting.

Gas-Fired Boilers are to provide the central heating of Wandsworth's New Civic Centre. The Municipal Buildings Committee in a report submitted to the Wandsworth Borough Council stated that it had had under consideration the type of fuel to be used for the firing of the boilers to be installed for the heating of the new Civic Centre at present in course of construction in High Street, Wandsworth, and had come to the conclusion that gas would be the most suitable and economical fuel. The Wandsworth and District Gas Company is prepared to enter into an agreement for the supply of gas fuel for a period of twenty years with an option to the Council to terminate at the end of seven years, and thereafter annually, the arrangement to include an agreed service charge to cover the regular inspection and service maintenance of the installation by the Company's workmen and the systematic testing of boilers by its technical staff. A recommendation was therefore submitted by the Committee that a contract on these lines be entered into with the Company.

During the Royal Jubilee Celebrations the Hitchman fountain, Jephson Gardens, Leamington Spa, is to be floodlighted by gas. The lighting is carried out by three lanterns each fitted with fourteen No. 2 mantles and a recent trial has been attended with great success. The Leamington Priors Gas Company, who carried out this work, are also to floodlight the Pump Room and the waterfall at the Mill Bridge.

Birmingham Ladies' Gas Circle

Lady Mayoress Presents Prizes

The Birmingham Ladies' Gas Circle was formed in 1932 by the City of Birmingham Gas Department to cater for the growing interest in modern gas appliances and their use by housewives.

Over 400 of the Circle membership of 1,500 gathered at the Grand Hotel, Birmingham, on April 11 and partook of tea at the invitation of the Birmingham Gas Committee.

The meeting was presided over by Alderman R. H. HUME (Chairman of the Gas Committee) and was graced by the presence of the Lady Mayoress (Mrs. S. J. Grey), who kindly presented prizes in the Cake Baking Competition, recently held for members.

The LADY MAYORESS said she was a devotee of gas, and, in any case, such a gathering as that would greatly influence her in its favour. It was three years since the Circle was formed in Birmingham, and the membership was now over 1,500. One could not help comparing the present with the old days when housewives were dependent on ranges for cooking. In these days cooking was easily performed by gas, and there was little excuse for spoilt dishes.

The CHAIRMAN proposed a vote of thanks to the Lady Mayoress and referred to Birmingham's huge annual output of gas. The proposition was seconded by Miss O. L. Humphries (Secretary to the Circle and Demonstrator to the Gas Department). The judges and Mrs. Murphy were also thanked on the motion of Mr. A. W. SMITH (Secretary and General Manager, Birmingham Gas Department), seconded by Miss M. V. PALMER.

Modern Home Making.

Mrs. Eileen Murphy, in the course of a short Address to the Circle, said that if a woman is smartly dressed you can be pretty sure that her home is well run. In these days of labour-saving equipment, brains count more in housework than elbow-grease. The same love of order and tidiness that makes a woman careful of her dress will make her careful of her home.

There is no such thing as an ideal kitchen—or rather, there are as many ideal kitchens as there are efficient housewives. Every woman has her own methods of working, and she must plan her kitchen according to the family income and the family habits. The only golden rule in home-making is to buy the very best labour-saving appliances you can afford, and to choose them with care. When you buy a good cooker or a good water-heater you are making a gilt-edged investment in health and comfort for the whole family.

A gas refrigerator is a great help in buying food, because it enables the housewife to buy perishable foods in larger quantities, and also to take advantage of low prices for first-class meat or poultry, even when it is not to be cooked at once.

As for cooking, seven million Englishwomen already cook by gas. The King's House which is now being built in Surrey has a gas cooker. It was chosen by a special committee after careful investigation of other types of cooker.

Incidentally, the influence of Birmingham cooks is spreading. A London hotel-proprietor swears by the recipes in a cookery-book recently published by Miss Humphries, the Chief Demonstrator of the Birmingham Gas Department.

Washing-up is the most boring part of the whole household ritual, but it can be alleviated if you are sure of having really hot water on tap. The kitchen is the nerve-centre of the house, a gas water-heater in the kitchen may save bad tempers in the bathroom.

Mrs. Murphy emphasized the health aspect of house-heating, the two essentials being radiant warmth and adequate ventilation.

Mrs. Murphy spoke briefly in conclusion of the national importance of the Gas Industry's work, and mentioned that 70,000 British miners are kept in employment by the Industry.

B.C.G.A. National Kitchen Planning Competition

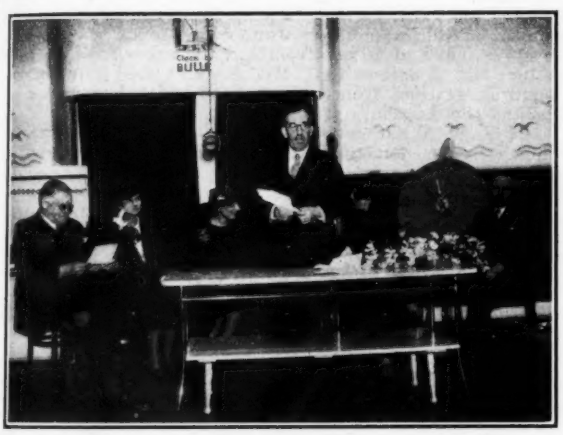
Lady Londonderry Presents the Prizes

The presentation by the Marchioness of Londonderry of the first, second, and third prices in the National Kitchen Planning Competition of the British Commercial Gas Association was the occasion of a very well-attended gathering in the Demonstration Theatre of the University of Cookery at the Ideal Home Exhibition, Olympia, on Wednesday, April 10. Those on the platform, in addition to Lady Londonderry, included the following: Sir David Milne-Watson, LL.D., D.L., Sir Francis Goodenough, C.B.E., Mrs. Darcy Braddell, the Kitchen Planning Expert, Mr. W. D. Rowe, Manager of the B.C.G.A., Mrs. Eileen Murphy, Director of the Home Service Section of the B.C.G.A., and Mrs. Pelham-Clinton.

A happy little ceremony preceded the prize-giving when a bouquet was presented to Lady Londonderry by Miss Alma Alexander, daughter of Mr. J. R. W. Alexander, Secretary of The Institution of Gas Engineers.

In introducing the Marchioness of Londonderry, Sir David Milne-Watson thanked her for her presence, and went on to refer to the universal interest that the competition had aroused.

Before presenting the prizes, the Marchioness of Londonderry expressed her pleasure at being able to be there, and added that she had a great personal interest in cookery. The fact that a man had won the first prize was somewhat surprising, but the ladies had redeemed themselves by winning the second and third prizes. She then went on to



Our photograph taken at the Prizegiving shows, left to right, Sir Francis Goodenough, Mrs. Eileen Murphy, Mrs. Darcy Braddell, Sir David Milne-Watson, the Marchioness of Londonderry, and Mr. W. D. Rowe.

refer to kitchen planning in general, and pointed out that many kitchens that were equipped with the latest fittings were not pleasant to work in because routine had not been studied. All unnecessary work should be eliminated, and the number of entries for the competition was proof positive of the interest that was being taken in the design of kitchens to-day. As a practical example of what could be done with modern gas appliances, she mentioned the kitchen, at the exhibition, that Mrs. Darcy Braddell had evolved from the most popular features of the entries. Lady Londonderry concluded her remarks by congratulating the competitors who had come forward in such great numbers.

The Judges' Task.

Mrs. Darcy Braddell remarked that the introduction of the prize winners to Lady Londonderry was a far more pleasant task than the adjudication of entries. She reckoned that if the judges had allotted a bare five minutes to each entry it would have taken them eight-three days, without ceasing to complete their work.

The Marchioness of Londonderry then awarded the prizes, each presentation being greeted with enthusiastic applause. A vote of thanks to Lady Londonderry was proposed by Miss Pelham-Clinton, who assured the audience that most people could afford labour-saving gas appliances. The vote was seconded by Mrs. N. Collins, of Stoke-on-Trent, a joint winner of the second prize, and Lady Londonderry suitably responded.

National Gas Council

Central Executive Board Meeting

A meeting of the Central Executive Board of the National Gas Council was held at 28, Grosvenor Gardens, London, S.W. 1, on Tuesday, April 9, 1935, at 2.30 p.m.—Sir DAVID MILNE-WATSON, LL.D., D.L., President, in the chair.

Annual Report.

The draft of the Seventeenth Annual Report was approved and adopted for submission to the Annual Meeting of the Council to be held on May 14 next.

Parliamentary.

(*a*) *Housing Bill.*—It was reported that the amendments put down on behalf of Public Utility Undertakers by the Conjoint Conference, and which were designed to exempt land which is the property of Public Utility Undertakers from liability to compulsory acquisition under the various provisions of the Bill, had been accepted by the Government.

(*b*) *London Building Act (Amendment) Bill.*—This Bill is applicable solely to the London County Council, and seeks to confer upon the Council certain powers to regulate by by-law matters which previously had been governed by Statute. Under the Bill the existing powers of the London County Council to make by-laws remain unrepealed.

(*c*) *South Shields Corporation Bill.*—It was reported that, although representations had been made by the local Gas Company to the South Shields Corporation that they should withdraw a clause in their Bill enabling them to form a Reserve Fund in respect of their Trading Departments, including the Electricity Department, out of the General Fund of the rates, the Corporation had refused so to do.

The South Shields Gas Company had, therefore, contested the matter before a Committee of the House of Commons with the result that the clause had been amended so as to make it impossible for a Reserve Fund to be maintained out of the General Fund of the rates.

Forthcoming Engagements

April.

26.—I.G.E.—Liquor Effluents and Ammonia Committee, 11 a.m.; Joint Research Committee, 2.30 p.m.
27.—I.G.E.—Examinations in Gas Engineering.
30.—SOUTHERN ASSOCIATION OF GAS ENGINEERS AND MANAGERS (EASTERN DISTRICT).—Meeting at 28, Grosvenor Gardens, S.W. 1, at 2.30 p.m.

May.

1.—MANCHESTER AND DISTRICT JUNIOR ASSOCIATION.—Visit to Rainhill. Paper by Mr. H. C. Jackson.
2.—MIDLAND JUNIOR ASSOCIATION.—Annual General Meeting. Paper by Mr. A. W. Smith.
3.—NORTH OF ENGLAND ASSOCIATION.—Annual Meeting at Newcastle-upon-Tyne. Paper by Mr. T. P. Ridley.
3.—LONDON AND SOUTHERN JUNIOR ASSOCIATION.—Annual Business Meeting.
3.—WALES AND MON. JUNIOR GAS ASSOCIATION.—Annual General Meeting at Cardiff, 6.45 p.m.
4.—I.G.E.—Examinations in Gas Supply.
11.—SCOTTISH JUNIOR ASSOCIATION (EASTERN DISTRICT).—Annual General Meeting. Paper by Mr. D. L. Dickson.
15.—B.C.G.A.—Meeting of the Executive Committee, 11 a.m.; General Committee, 2.30 p.m.
15-16.—EASTERN COUNTIES GAS MANAGERS' ASSOCIATION.—Spring Meeting at Stamford.
16.—B.C.G.A.—Yorkshire District Conference at York.
16.—MIDLAND ASSOCIATION.—Spring Meeting at Hereford.
18.—YORKSHIRE JUNIOR ASSOCIATION.—Meeting and Paper by Mr. C. A. Newham.
29.—B.C.G.A.—Midland District Conference at Worcester.

June.

4-7.—I.G.E.—Annual General Meeting in London.
22.—LONDON AND SOUTHERN JUNIOR ASSOCIATION.—Summer Visit to Winchester.
25.—SOUTHERN ASSOCIATION.—Visit to Guildford.

A Further Ideal Home Exhibition Display

We referred in the "JOURNAL" for April 3 to the very attractive stand of R. & A. Main, Ltd., at the *Daily Mail* Ideal Home Exhibition at Olympia. Above is a general view of the display which fully bears out our previous remarks.

Institution of Engineers-in-Charge

Thirty-Fifth Annual Dinner

The Jubilee Year of Their Majesties' Reign and the Centenary Year of Local Self-Government combined to make the Thirty-Fifth Annual Dinner of the Institution of Engineers-in-Charge an auspicious occasion.

Under the Chairmanship of the President of the Institution (Mr. E. A. Sandford Fawcett, C.B., M.Inst.C.E.), more than 300 members and guests sat down to dinner in the King's Hall of the Holborn Restaurant on April 12; and in recognition of the Jubilee Year a telegram of loyal greetings and congratulations was sent on behalf of the Institution to Their Majesties, and a gracious acknowledgment of this was received during the course of the evening.

The toast list was a long one and ably discharged by a number of well-known figures. After the loyal toast, which took the novel form of coupling Their Majesties' names together as a mark of recognition of their 25 years' reign, followed by that of H.R.H. the Prince of Wales, the toast of "The Institution of Engineers-in-Charge" was proposed by Dr. H. Levinstein (President of the Institution of Chemical Engineers), who said that members of such institutions comprised men whose business was to deal with machinery and problems of a scientific character. They represented a sane element, he suggested, in a distorted world. He wished the Institution all success and a steadily increasing membership.

The President introduced his response with the remark that he and the Hon. Secretary (Capt. A. E. Penn) had just made a new rule—and one which might be followed with advantage by other similar bodies—namely, "That the President is not allowed to speak for more than five minutes on any occasion." He went on to refer to the prosperity of their Institution, which received, he said, the hearty support of all its members and staff, and he referred with pleasure to the many Institutions which were represented among them on that occasion.

"Our Municipal and Government Services" was proposed by Mr. W. Reavell, M.I.Mech.E. (President of the British Engineers' Association), and jointly responded to by Mr. R. G. Hetherington, C.B., O.B.E. (Chief Engineering Inspector to the Ministry of Health), and Mr. T. Pierson Frank, M.Inst.C.E. (Chief Engineer and County Surveyor to the L.C.C.).

Lt.-Colonel J. D. K. Restler, O.B.E., M.Inst.C.E. (Immediate Past-President), proposed "Our Guests and Friends," which was acknowledged by Major W. W. Grantham, K.C. (Deputy-Chairman of the L.C.C.); while the final toast—that of "Our President"—was in the hands of Mr. C. W. Dawe, who paid well-merited tribute to Mr. Sandford Fawcett and his work on behalf of their Institution.

The entertainments with which the speeches were interspersed assisted in making the function an unqualified success, which will be long remembered by those who attended.

Manchester Juniors' Annual Dinner

The Annual Dinner of the Manchester and District Junior Gas Association was held at the Waldorf City Hotel, Manchester, on April 6, under the Presidency of Mr. JAMES CARR.

Among the guests were Mr. A. L. Jennings (President of the Manchester and District Association of Gas Engineers), Colonel W. M. Carr (Stretford), Mr. R. Halkett, Junr. (President, Yorkshire Junior Gas Association), Mr. J. Bridge (Elland), Colonel Falk (Stoves, Ltd.), and Mr. Butterworth (Messrs. Parkinson and Cowan).

Mr. JENNINGS, in proposing the health of "The President of the Manchester and District Junior Gas Association—Mr. James Carr," said that it would be difficult to find a name so well known in the Gas Industry as that of "CARR." He had very pleasant and happy recollections of Mr. Carr's father. It was the case of the father's interest being followed by the sons, and the Manchester and District Junior Gas Association were fortunate in having one of those sons as their President. Speaking as the President of the parent Association, it was a great pleasure to him that the Presidents of both the Manchester and the Yorkshire Junior Associations had a seat on their Council, and also that they elected a member to represent them on the Council of the Junior Association. Mr. Crowther (Salford) had recently been elected to the Council of the Manchester Junior Association, and the Council would find in him one who would always be ready to help them. Until recently, Mr. Buckley had been their representative, and had carried out his duty in a very efficient and gratifying manner. "With regard to your President," continued Mr. Jennings, "I am sure you will all feel that he has filled the position with marked ability and has upheld the high traditions of the office.

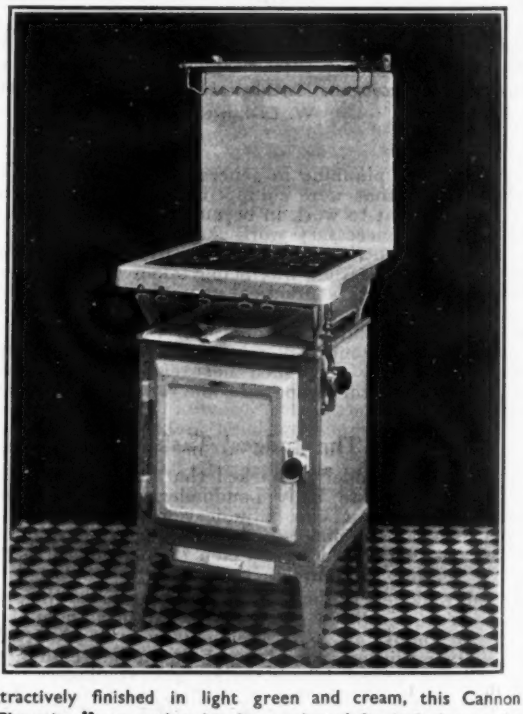
Mr. JAMES CARR, in thanking Mr. Jennings, said the Council of the Manchester Juniors would be very pleased to have help and advice from Mr. Crowther, and he could assure Mr. Jennings that Mr. Buckley had put forward sound suggestions from time to time which had materially assisted the Association.

Mr. T. H. WILLIAMS (Senior Vice-President of the Manchester and District Junior Gas Association) proposed the toast of "Kindred Associations." He acknowledged the interest taken in their Association by the parent body, and particularly the services rendered by Mr. Buckley.

Mr. HALKETT, Junr., responded.

Mr. A. K. COLLINGE (Junior Vice-President of the Manchester and District Junior Gas Association) proposed the toast of "Our Guests," and Colonel FALK and Mr. BUTTERWORTH responded.

For the King's House



Attractively finished in light green and cream, this Cannon "Champion" gas cooker has been selected for inclusion in the Chauffeur's Kitchen of the King's House.

THE DESIGN AND OPERATION OF Upwardly-Heated Vertical Retorts

by
H. PARTINGTON

In a Paper before the Manchester and District Junior Gas Association on April 6, Mr. H. Partington, A.M.C.T., of Bolton, dealt with some of the principal features of the upwardly-heated vertical retort, and set out the main advantages of the system

The introduction of upward-heated verticals is quite recent, and it was thought that a Paper dealing with some of the features of this type of setting would be of interest to the members of this Association.

The following are some of the advantages claimed for this type of setting:

(1) Gradual heating of the coal giving less temperature gradient between the coal and the brickwork at any point and consequently less spalling.
(2) Better water gas reaction due to steam meeting coke at a higher temperature.
(3) Better coal travel, since the coal is heated gradually and swelling only takes place gradually. Hence ability of this setting in dealing with slack coals.
(4) Higher thermal yield per ton.
(5) Longer working periods and less scurf formation.

The remarks in the following Paper are based upon experiences with a bench of twenty-four 72-in. retorts. These retorts were built by the Woodall-Duckham Company to replace an existing W.-D. setting of similar size but of the more orthodox downward-heated type. The setting was lighted up in October, 1933, and has been in continuous operation since. It is arranged symmetrically in two halves of twelve on either side of the chimney, each half being fed from its own producers, which are built at retort level at the ends of the setting. The producers are of the standard 4-door step-grate type working under pressure. Each half of the setting can be worked independently.

The half setting is again divided into two sections of six retorts, each section feeding outwards into its hydraulic main running along the outside of the rodding stage. The four sections thus obtained are each governed by a separate area governor, the outlets of which are joined into the common foul main.

The offtake pipes are arranged so as to slope downwards and outwards to the hydraulic main by way of a saucer-valve which is closed as the retorts go off. Liquor sprays are fitted in all offtake pipes keeping them washed free of tarry deposits. Owing to the disposition of the offtakes and the wide centre gangway, the retorts are very easy of access and the top conditions are good as regards ventilation and working conditions.

Lighting-Up.

Owing to the fact that the producers were made to replace existing producers at retort level, the characteristics of this setting depart from the usual type where they are at ground level. Thus, the CO has first to be drawn down to the base of the combustion flues, whereas in the standard setting the CO rises naturally from ground level to this point.

On lighting up some difficulty was experienced in going over to gaseous firing due to this deviation from standard practice. The flues had been gradually brought up in the usual manner to a uniform 300° C. at the C.T. and the chimney pull was 3/10 in. This chimney pull, which was thought ample by Woodall-Duckham operators in view of past experience with standard upward-heated settings, proved to be insufficient in this case, and consequently some trouble was encountered in establishing flames in the combustion flues. As soon as flames were established in some of the retorts, the chimney pull increased and a sufficient follow-through effect was obtained.

When the setting was first put to work, trouble was experienced in getting the gas away from the four sections. This was traced to the four sectional governors, the butterfly valves of which had been situated in the vertical uptake pipe connecting the hydraulic main to the top foul main. Condensation taking place in this pipe was met by the rising gas at the butterfly valve, where the area of the pipe was restricted, and this caused baffling of the gas. On moving the butterfly valves to a point on the horizontal portion of this pipe the trouble disappeared.

General Working Conditions.

Heat Regulation.—The working temperatures are maintained at between 1,350° C. and 1,400° C. at the combustion chambers and between 1,050° C. and 1,090° C. at the CO_2 collecting flues (MD level), the MD level in this case being situated at the top of the setting. Scurfing temperatures are kept at 1,200° bottom and 950° top, approximately.

Long heat or "volume" of heat is found of more importance than high temperatures persisting only for a short length of the flues; "lazy" travel conditions are aimed at, so that the greatest heat interchange may ensue and also so that the fall in temperature between the top and waste flue may be at a maximum.

Slight vacuum is maintained at the CO damper tiles and level gauge at the top sight holes (or "O" boxes).

The CO pressure is most important. The optimum CO pressure has been found to be 1½ tenths water gauge. To maintain this constantly a continuous CO pressure recorder of the Arkon type has been fitted into the cross-flue from each section of producers.

The chimney pull is of the order of 3-4 tenths—a much lower pull is necessary since the gases are following their natural upward flow. Once the chimney pull is decided upon it is essential that it be rigorously maintained, since an increase of ½ tenth pull will often cause a temperature rise of 40° all round.

Originally, the working chimney pull was 3 tenths, but for reasons explained later this was increased to 4 and finally 4½ tenths. It was found that the control of temperature within working limits could be carried out by a manipulation of the CO dampers alone without the need for alteration of the MD's, which in ordinary practice are generally left at 7 in. working, and 5 in. scurfing positions.

When the setting was first put to work the CO tiles worked over the full CO opening of 10 in. width. Very small movements of the CO dampers (even ⅛ in.) were equal to a fairly large area alteration, and this fact, coupled with the small working pressures, gave rise to large alterations in temperatures. In order to give a vernier control a tile with a 3-in. opening was inserted into the chase and the adjustments were made on a jockey tile. By this means three times the previous damper movements were allowable for the desired alterations, thus giving more precise control.

Each retort is fitted with CO, MD, and secondary air control for both left and right hand sides. In addition eight secondary air tiles are available, one for each flue round the retort. Since each flue strikes its own balance with regard to combustion mixture, the regulation of the temperature of all the eight retort-heating flues can be made independently of the others. Four flues can be seen per retort at the "O" boxes, but the remaining four can be seen if required by inspection of the top CO_2 collecting flue and also at the CO nostril chamber at the bottom.

The setting was found to be extremely responsive to all controls and the effects of adjustments usually manifest after only two hours.

Auxiliary air flues for the admission of tertiary air higher up the retorts are fitted, but these are not in operation and in recent installations have been omitted.

Owing to the extreme flexibility of the setting and its sensitiveness to any variation in operating conditions, the daily fluctuations in temperatures were not easily determinable, since checking on the CO damper did not always cause uniform reduction in temperatures on the inner and outer flues; also each retort varied independently of the others, the amount of change not being easily determinable

but depending on the " fine " setting of the controls. The following experiments were, therefore, carried out:

(1) The trial of a larger secondary air slide opening than ¾ in. which was the average opening.
(2) The trial of check nostrils in the combustion flues.
(3) The trial of a greater chimney pull than 3 tenths.

A retort was chosen for greater secondary air slide openings. These were opened to 3 in. from ¾ in. while the secondary air check tiles were closed. The retort was persevered with for a week, but the secondary air tile adjustments became so fine that it was not found possible to maintain uniform heats. This was repeated with smaller secondary air openings, but the results were not satisfactory, so that finally the ¾ in. opening was reverted to.

Then large check nostrils with a 5-in. by 3-in. opening were inserted into the combustion flues of the retort. This resulted in an improvement, and the heats answered uniformly to any checking of the CO damper. Then 5-in. by 2-in. nostrils were tried and found to be giving very steady and uniform heating, but the checking effect was such that it was not found possible to bring up the temperatures above 1,270° C. It was therefore decided to insert 5-in. by 3-in. nostrils in all retorts and work with a greater chimney pull than 3 tenths. A pull of 4 tenths was tried and found to be very satisfactory, and the temperatures were easier to obtain and maintain, both on the inner and outer flues. Finally, the chimney pull was increased to 4½ tenths to give a greater working margin on the main dampers.

The regulation of the heats was now simpler, and fluctuations from day to day were less marked, while regulation could be done with confidence that the retort would answer in the desired manner, and also that the balance of temperature in the four flues would not be upset.

In order to maintain a definitely steady chimney draught, four large flap-dampers are inserted into the base of the chimney. These flaps work on ball-races kept well lubricated with grease-cups, and a routine for their lubrication is in operation. Disc weights are fitted on a counterbalance screw, and by adjusting these the pull may be altered as much as 1 tenth altogether, without resetting the waste-heat boiler butterfly damper. For small alteration in chimney pull the adjustments should be preferably made on the flap-dampers and not on the waste gas butterfly valve.

The flap-dampers are very effective in damping out any oscillation or fluctuation in pull which may be set up by wind-gusts or " hunting " fan motors.

With this type of setting it is essential to keep steady conditions of chimney pull and CO pressure if even heating be desired, but if gauges of suitable range and sensitivity are fitted the resultant working gives heats which do not fluctuate from day to day more than a few degrees (provided that there is no marked change in the type of coal carbonized). If the heats should be found varying the reason can usually be seen by consulting—

(*a*) CO pressure recorder, or,
(*b*) chimney recorder,

in which case the reverting to set conditions generally gives the temperatures obtaining before, in about three hours' time.

Occasionally, however, one flue may be found down in temperature. This can be due to one of three causes:

(1) Blocking-up in one of the flues or nostrils.
(2) Loose damper covers, or ill-fitting covers.
(3) Coal travel down one corner of the retort.

Attention should, therefore, be directed to these points before attempting to bring up the temperatures by the usual methods. With this type of setting excess secondary air or excess CO can result in poor heats, and the differentiation between the two is not readily observable by inspection, as may be done with other types of setting. A useful tip in case of doubt is to drop a small piece of waste or paper down the flue, when excess air will be demonstrated by a bright burning of the waste. Excess CO, on the other hand, will be shown by a smoky flame in the flue. This saves the time and trouble of an Orsat analysis.

Fluing.

The retorts are flued each time off for scurfing, so that the flues and the nostrils are kept clear. The short necking from the CO damper to the CO nostrils seems to be the chief source of restriction, since the CO gases change here from a downward to an upward direction depositing flue dust at this point. This dust is quite soft and easily raked out, but the air slide openings just below should be protected from the dust by covering over with a small square of asbestos sheet, since the fine dust would be immediately drawn in by the vacuum existing at this point. In addition a furry deposit gathers round the 5-in. by 3-in. nostril tiles. This deposit, although soft, restricts the CO_2 passage and is cleaned out weekly by gently scraping round with a fine rod inserted down the top sight hole.

The Working Period.

The retorts were tried with a view to determine the useful working period. Nos. 1 and 2 after six weeks were working to the cutter several days before going off. No. 2 had a scurf formation about 10 ft. down on the offtake side but elsewhere the scurf was only light. This seems to justify the claims for longer working periods, and less scurf formation with upward heated retorts, but Nos. 3 and 4 gave trouble at the end of five weeks with a fairly heavy scurf formation about 10 ft. down, also on the offtake side. In addition the general scurf formation was uniformly thick extending well down to about 15 ft.

Scurf was being brought out with the coke after five weeks' working. Nos. 5 and 6 after 42 days were working to the cutter.

It was apparent that the retorts would only work six weeks with difficulty. With some retorts actual trouble was experienced and with others the retort tightened up and only took its coal with difficulty. This resulted in a drop in make per ton. It was therefore arranged to limit the working period to about four weeks with the consequent reduction of the time needed for scurfing.

While the retorts are off, a careful inspection for any leakage is carried out. Two methods are available for detecting small leaks—either

(1) to put the flues under CO pressure by closing the MD's and opening the CO dampers, when the leak can be seen as a small flame burning into the empty retort, or,
(2) the cold air test—where the flues are put under vacuum by opening the MD and closing the CO (the opposite of the above) and admitting air to the retort by taking off the top cover.

In this case the leak shows up black against the brickwork of the retort. The cold air test has been found rather more sensitive for small leaks and is particularly applicable to this type of setting where pressure in the flues is not readily obtainable.

Any small leakages found are then immediately stopped with the patching gun. Up to recently only about half-a-dozen small leakages have been seen, and these so small as to escape visual observation.

Top spraying of the fireclay courses is also carried out with a grog of " S.P." cement. To do this, the retort is checked for a short time rather lower than normal scurfing temperatures, but at no time must the temperature of scurfing retorts be allowed to fall so as to endanger the fireclay silica jointing.

The steam used for the water gas reaction is all that is necessary for quenching the coke. Water sprays are fitted but are only used as occasion demands. Originally each retort was fitted with a single steam jet, the position of which was such that the coke in extraction rubbed over the nipple. The jets frequently blocked up with coke dust causing loss of make and thermal output. On occasion the jets have been found to be blocked only ten minutes after cleaning. The single jets were therefore replaced by two open-ended branch pipes placed lower down in the casting, the amount of steam being controlled by a single disc situated in the pipe feeding these. This system has given greater satisfaction, but it is essential that the steaming facilities should be unrestricted and attention to keeping them clear carefully given.

A routine is in operation for the systematic cleaning of the steam inlet pipes. This is carried out weekly unless occasion demands extra cleaning.

Producers.

As stated, the producers are on the same level as the retorts—*i.e.*, well above ground level; and owing to space consideration the injectors are Venturi tubes with a double bend or " U " shape. Owing to this shape, trouble was experienced with water logging and baffling in the injectors, reducing the air blast and consequently reducing the output of CO. This difficulty has been overcome by fitting sealed drains to the injectors. Top and side steam cooling is employed to reduce clinker formation, with water sprays and drip plates as emergency coolers. One injector is kept on while charging the producers to prevent the fall of CO pressure below zero in the producer cross-flues and augmentation flue.

Augmentation Flue.

Two waste-heat boilers are employed with this setting. As the original boiler to the setting before construction was small it was supplemented by another one to make use

the waste heat available. In order to maintain this oiler at efficient steaming output when the setting is on ght load, a flue was constructed from the producer cross-e to the waste-heat boiler inlet. Secondary air is ad-itted to a regulated amount of producer gases drawn in is way through the waste-heat boiler.

Results Obtained.

When the setting had been in operation over six months test run was carried out by Woodall-Duckham's erators.

No air was admitted to the purifier inlet, the extractor eed was set at 310 r.p.m. and the gaps were varied by e operators according to the amount of coal each retort uld usefully take—the average gaps being 5 in. open.

3 *p.m.* 10/5/34 *to* 3 *p.m.* 17/5/34.

Coal used for test	1,012·375 tons
Throughput	6·57 ,,
Make per ton	20,049 c.ft.
Therms per ton	90·601
Average C.V.	451·9 (Fairweather recorder)
Coke to producers	157·6
Lbs. of coke per 100 therms	384·9

As coals of not greater than 8% ash and moisture were ecified in this test, the following correction was applied bring the figures to a specified 8% ash and moisture ntent in the coals:

$$\text{Corrected tonnage} \left(\frac{x}{100} \left(\frac{(100 - T) \times 100}{100 - 8} \right) \right)$$

where x = tonnage coal as weighed
T = total % ash and moisture
8 = ash and moisture allowed.

Applying this correction then,

Corrected coal used (allowing for ash and moisture in excess of 8%)	= 969·6 tons
Corrected make per ton	= 20,934 c.ft.
Corrected therms per ton	= 95·627

Other Relevant Figures.

% steaming	= 31·5%
Average moisture content of coke	= 4·9 ,,
Corrected coke to producers	= 150 tons
Corrected lbs. of coke per 100 therms	= 365·21 lbs.

The week's average gas analysis was as follows (this nalysis is the average of seven daily samples each collected ver 24 hours):

	% by Volume.
CO_2	= 4·8
O_2	= 0·3
C_nH_m	= 1·8
CO	= 19·4
CH_4	= 18·6
H_2	= 49·6
N_2 (diff.)	= 5·5

Calculated C.V. = 446
Actual C.V. = 451·9
Week's average Fairweather recorder.

Analyses of Coals During Run No. 1.

—	Ash, %.	H_2O, %.	Volatile, %.	(Ash + H_2O) − 8%.
May 9	7·9	2·18	34·32	2·08
,, 10	8·63	2·24	32·71	2·87
,, 11	9·0	2·50	33·50	3·5
,, 12	7·7	4·59	32·64	4·29
,, 13	6·77	4·47	33·45	3·24
,, 14	8·68	4·44	34·53	5·12
,, 15	10·30	4·33	32·06	6·63

A further week's test was carried out (17/5/34 to 4/5/34) admitting air to the purifiers and with a fixed ap of 5/8 in. and an extractor speed of 290 r.p.m. Briefly the results were:

Coal used for test	1,036·8 tons
Throughput	6·72 ,,
Make per ton	19,872 c.ft.
Average C.V. (Fairweather recorder)	451·5 B.Th.U.
Coke to producers	159·85 tons
Lbs. coke per 100 therms	384·9
Coal analysis (average)	H_2O − 5·67% Ash − 7·16 ,,
Corrected coal	981·9 tons
Corrected make per ton	20,779 c.ft.
Therms per ton (corrected)	94·774

(Allowance for air at purifiers would probably give another 2 therms per ton.)

Temperatures, average at bottom . . 1,323° C.

Gas analysis (average for week of 7–24 hour samples):

	% by Volume.
CO_2	= 4·6
O_2	= 0·5
C_nH_m	= 1·8
CO	= 19·1
CH_4	= 18·9
H_2	= 49·2
N_2 (diff.)	= 5·9

Calculated C.V. = 447 B.Th.U.
Actual C.V. = 451·5 ,,
Week's average Fairweather recorder.

Week's Average Coal Analysis. Test No. 2.

H_2O	5·67%
Ash	7·16 ,,
Volatile	32·50 ,,
(Ash + H_2O) − 8	4·83 ,,

Conclusion.

In conclusion, I would say that rather undue prominence has been given in this Paper to the difficulties met; these may be qualified here in view of the satisfactory output and general working of the setting after attention has been given to the points mentioned. Also the difficulties are no more than would be met in the usual run of events when dealing with new plant.

I would like to make acknowledgment, finally, to the Gas Engineer, Mr. W. J. Smith, for his permission to give this Paper and the figures which it contains, and also to thank my colleagues for their assistance in preparing the Paper.

Discussion.

Mr. JAMES CARR (President) said he was pleased that reference to the errors made in the early stages of operating the plant had been brought out in the Paper, in addition to the good results that had been obtained. He would like to ask Mr. Partington if, with the increased pull found necessary, there had been an increased quantity of fuel used per ton of coal carbonized. The yield of 90·6 therms per ton of coal carbonized was certainly interesting, but how did it compare with other systems of carbonization under similar conditions?

Mr. A. K. COLLINGE (Preston) said that the Paper had presented the advantages of upward heating of vertical retorts, but it appeared to him that it was a scathing criticism of previous methods of heating. At Preston, they had eight beds on the downward and two beds on the upward system. On the downward system they could, and did, obtain any desired temperature, but on the upward system they could not get the bottom temperature as high as previously. This defect had now been remedied by having the secondary inlet higher up. The two advantages remaining were, first, if there were small leaks in the retorts it was better to have level gauge instead of pressure and thus avoid waste gas getting into the retort. The other advantage claimed was the reduction in fuel consumption. This latter claim was not justified. Fuel consumption depended on the temperature of the gas leaving the setting. If the temperatures were the same, the fuel consumption would be the same. Mr. Collinge stated that, in his opinion, it was better to warm up the retorts from the top instead of from the bottom. He would like Mr. Partington to give the relative fuel consumptions of the two systems. His experience was that fuel consumption was identical in both systems. Both systems were equally suitable, the upward heated system required very slightly less pull, so that in the control there was nothing in it.

Mr. N. PARTINGTON (Oldham) remarked that it had been his fortunate experience to carbonize the same class of coal in different types of settings, and the results obtained were exactly the same. He would like to have comparative data between the two systems—*e.g.*, scurfing time, yield per ton, spalling effect, &c.

Mr. BENSON (Bolton) stated that extensive tests had been made on the two systems with various coals, and it had been found that coals could be worked in the upward system which would be difficult to carbonize in the downward system—*i.e.*, greater swelling coals. The scurfing period on the downward system was from 3 to 4 weeks and on the upward 4 to 6 weeks.

Mr. J. ALBINSON (Partington) was disappointed that the latest equipment for modern settings required 15-16% of coke for carbonization. All systems of vertical retorts were hopelessly out of date in regard to the heating arrangements. Regenerators had been tried in vertical retorts, but had not been successful. In his opinion, some other means of heating vertical retorts was desirable—*e.g.*, some method of mixing the waste gas with the incoming secondary air instead of having to adopt the waste-heat boiler. He suggested that experiments should be carried out on the lines of bringing back some of the flue gas into the secondary air. The heating of vertical retorts was hopeless when compared with the modern coke oven.

Mr. F. A. RHEAD (Wallasey) inquired what proportion of breeze could be used in the producer. At Wallasey 13-14% of fuel by weight was used, and 80% was less than ½ in. This breeze, which was practically useless, was utilized and more coke was available for sale.

Mr. J. T. HAYNES (Rotherham) said that he was inclined to look at the Paper with rather a coke oven bias. It was impossible to compare vertical retorts with coke ovens. One produced a low grade gas and the other a high grade gas. The design must differ as the object in each case was so different. He thought that in comparing the respective merits of installations, flexibility should be taken into consideration. Once coke ovens were lighted up they remained at work for 20 years and there was no shutting down. The flexibility of vertical retorts to carry the varying load between summer and winter must be taken into consideration. The question of benzole extraction had not been mentioned. Mr. Haynes was strongly of the opinion that it was advisable both from the national point of view and the undertaking's point of view that benzole should be extracted from town's gas. Had any comparative tests been

made on the gas from upward heated retorts and the gas produced from other vertical retorts, with this object in mind?

Mr. N. PARTINGTON (Oldham) then proposed a vote of thanks to the reader of the Paper. He said that one point had been overlooked—viz., that the capital cost of an upward heated installation was less than the downward.

Mr. J. MELLING (Radcliffe), in seconding the vote of thanks, stated that they were experimenting with upward heated retorts, but so far they had not got complete data between the two systems. There was no saving, however, in the coke used in the retorts, the figures being the same.

The Author's Reply.

Mr. H. PARTINGTON, in reply to the discussion, stated that since the pull had been increased there had been no fuel tests carried out. With regard to the yield, the average working results obtained could be taken as 88 therms per ton of coal carbonized, or 19,500 cu.ft. of 450 B.Th.U. gas. The upward heating system had many advantages to commend it, and they had found that any temperatures could be obtained from top to bottom. In attempting to reconcile the facts stated by Mr. Collinge, it must not be overlooked that the class of coal carbonized, situation, &c., all had their bearing on the final results obtained. Time alone would decide which was the better system.

In reply to Mr. N. Partington he stated that the scurfing period of the upward system was greater than the downward. The make per ton with the upward system was 19,600 cu.ft. and with the downward 18,000 cu.ft. The retorts at Bolton had been working a full 18 months and there had been no spalling.

THE PROBLEM OF Street Lighting

by C. A. MASTERMAN, M.A

In a Paper before the North-Western Branch of the Illuminating Engineering Society, Mr. C. A. Masterman, M.A., F.I.C., of the Gas Light and Coke Company, emphasized that the provision of good lighting in our streets and the proper use of the Street Lighting Specification are handicapped by the fact that there are far too few engineers who have made a special study of the art, science, and economics of street lighting.

Before introducing this Address it should be made clear that while the field of street lighting is highly competitive as between gas and electricity there are few, if any, contrasts in technique especially favouring either illuminant. The small light source in the electric filament lamp may be capable of more precise focus in redistribution of light, but this very precision requires a similar precision in setting of the redistribution devices. The gas mantle in size is intermediate between the familiar filament and the latest development of the electrical industry—the hot discharge tube.

The colour and reliability of light can be judged by any non-technical observer, while factors such as size or weight of housing, length of effective life before replacement of mantle or lamp, &c., will be reflected in the costs.

The discussion of the street lighting problem can therefore omit reference to the type of illuminant employed and can concern itself solely and usefully with the technical problems of how much light should be provided, how the light sources should be arranged, and what type of light distribution is the most desirable.

Origin.

The first type of street lighting was doubtless by the torches carried by the users of the street or their attendants. The purpose of such illumination as was thus provided was chiefly for safety where every dark corner might conceal an armed man or footpad, while the road surface might be of the roughest type and littered with debris.

In the 18th century permanent lamps in the street were familiar, the effectiveness of which can be judged by the sensational impression created early in the 19th century by the introduction of plain jets using gas as an illuminant.

Successive periods have witnessed the introduction of the Welsbach mantle, the filament lamp, the arc lamp, and recently the hot discharge tube. Only within the last few years has real consideration been given to the purpose of street lighting and how that purpose can best be served.

Purpose of Street Lighting.

A fundamental difficulty in defining ideal street lighting lies in stating precisely the object of street lighting. Its origin lay in a protection against lawlessness, a function still of the utmost importance and one in danger of being overlooked. To the pedestrian street lighting is of the greatest convenience in enabling him to find his way about and to avoid colliding with other pedestrians or obstacles on the footpath. Since vehicles are required in any case to carry lamps there should be no difficulty in the pedestrian wishing to cross the road being able to see approaching vehicles even in the absence of street lighting, though there may be doubt as to whether the driver of the vehicle can see the pedestrian. Certain it is that when the street lighting fails it is of comparatively little embarrassment to the motor driver, except so far as he may be blinded by approaching headlights, but to any pedestrian the black-out is highly inconvenient and to a nervous one somewhat frightening.

There is finally a definitely exhilarating effect about bright lights whether in the form of fireworks, bonfires, or floodlighting, and it is therefore a matter of no surprise that civic pride leads to high degrees of illumination in the lighting of important thoroughfares where people congregate.

The connection between traffic safety and street lighting has on a number of occasions been the subject of review, especially in America. The Transactions of the Illuminating Engineering Society of the United States of America, January, 1935, contains a number of Papers bearing on this subject. A very definite relation is derived between inadequate lighting and street accidents. For instance, it is stated that when the street lighting in Detroit was reduced by about 35% owing to the financial depression the ratio of night to day fatal street accidents increased from about 1 : 1 to 2 : 1.

In the Ministry of Transport report on fatal road accidents during 1933 interesting figures are given, but out of the total fatal roll of over 7,000 only 130—that is less than 2%—are attributed to the absence or inadequacy of street lighting. Of the total accidents, pedestrians were concerned in 50%, while of the whole 22% are reported as having occurred at road junctions. In classifying the traffic, only 5% of the accidents occurred where traffic was heavy, 35% where it was moderate, and 60% where it was light.

The report contains a table showing the incidence of accidents in built-up and not built-up areas during each of the 24 hours for each of the months of the year. This table I have subjected to analysis with a view to seeing whether it can give an indication of the effect of street lighting on accident rate. Care is necessary to make certain that the results are not vitiated by changes in the volume of traffic summer and winter, changes in road surface conditions, &c. It is possible to pick out a number of hours at dawn and dusk which, during the summer, represent daylight conditions and during the winter represent dark conditions. In built-up areas where it may be assumed for the most part some degree of street lighting is provided, the fatal accidents during these hours of dark in the winter exceed those during these hours in daylight during the summer by about 15%, while in the areas not built-up and where presumably there is no lighting they exceed them by about 3%. The contrast, therefore, is not superficially marked, but analysis of the accidents during the night shows in built-up areas that summer fatal accidents exceed winter fatal accidents by 20%, and in areas not built-up by 80%—

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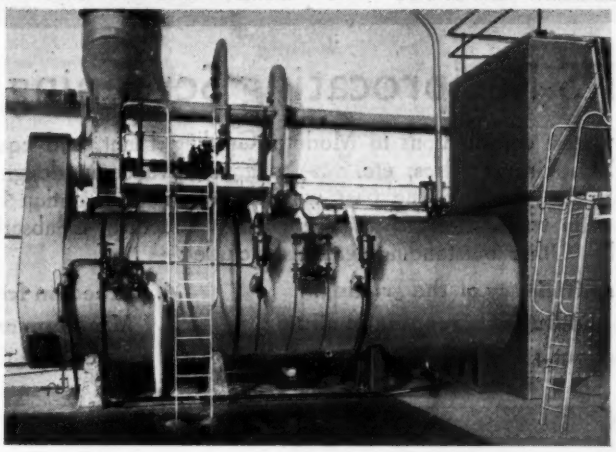

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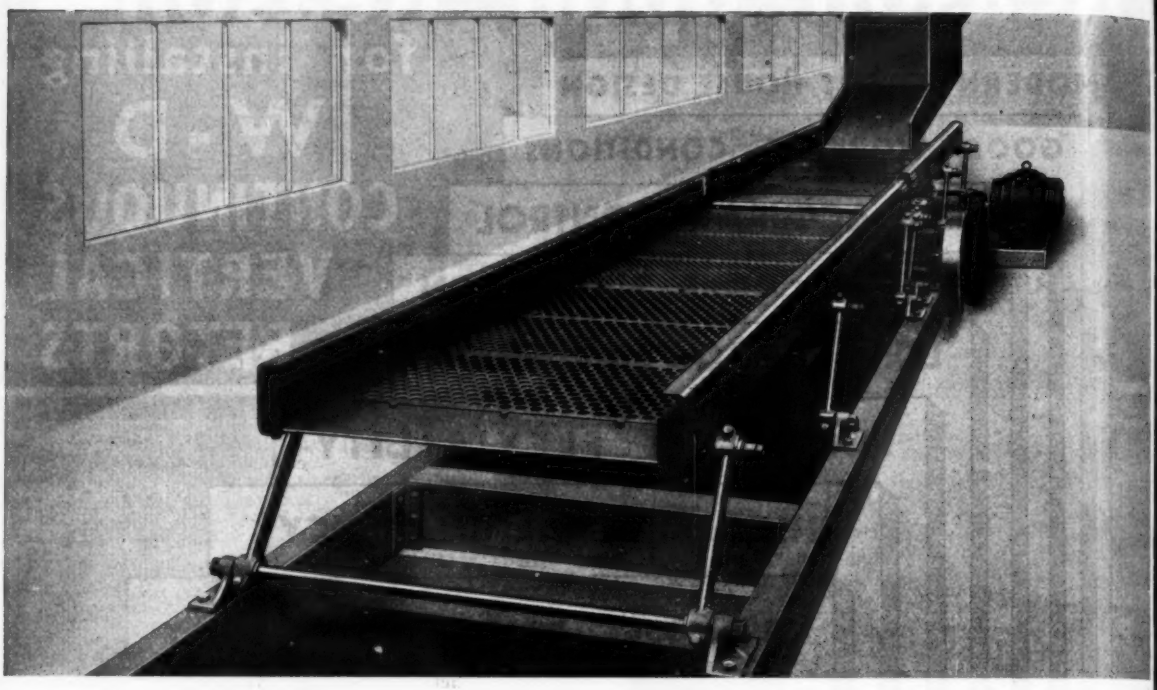

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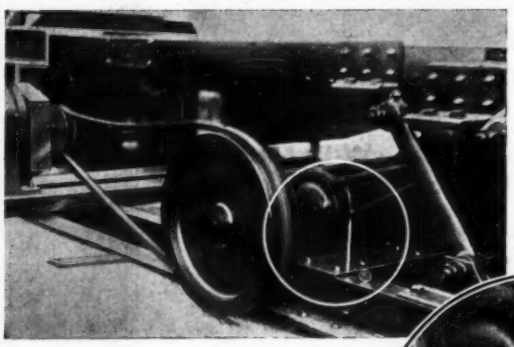

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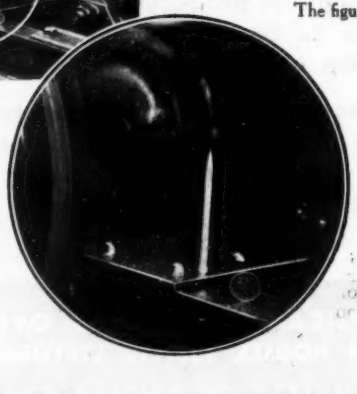

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presumably owing to the greater amount of traffic during the summer as compared with the winter. The same comparison in less degree is found to exist during the day between summer and winter. If, therefore, allowance is made for this greater accident tendency in the summer, we find statistically that in built-up areas there is 35% more probability of an accident in the dark winter hours before dusk or after dawn compared with the corresponding summer daylight after dusk and before dawn. In areas not built-up where presumably there is no street lighting this probability is increased to about 80%.

I conclude from this a very definite relation between street accidents and street lighting, and it would seem that the provision of some form of lighting on the average decreases the probability of accident by about one-half, but there is clearly some way to go in the provision of better lighting to reduce the probability of accident still further.

The recent introduction of a speed limit in built-up areas perhaps decreases the need for the most brilliant form of lighting, but a sufficiency should be provided on roads carrying any considerable degree of traffic to encourage the driver to travel without headlights.

Street Lighting Specification.

A Committee of the British Standards Institution has been busy drafting, publishing, redrafting, and revising specifications covering street lighting for a period of years. A further revision of the current specification is being circulated at the present time for comment. At the same time specifications or codes exist in many other countries, some of them having little in common with the requirements of the British Standards Specification.

Finality has not been reached, nor will it be reached for many years. The discussions arising out of the B.S.I. specification have, however, beneficially affected British practice in street lighting, and an examination of the terms of that specification is therefore fully warranted, the more so as so much criticism of it has been expressed. This criticism takes one of two forms and often both forms simultaneously. On the one hand the specification is considered inadequate and incomplete, and on the other hand much too complicated. A simpler specification still less complete could easily be drafted, or a more complete specification could be prepared requiring a greater effort to understand its provisions. The truth is that lighting is a highly technical problem and street lighting the more so in that it is simultaneously attempting to serve several purposes.

The B.S.I. specification proper merely states a number of classifications of installations, each classification to fulfil three primary conditions. These conditions are:

(1) That the illumination at no point in the carriageway (and footway) should fall below a certain minimum.
(2) That the heights of the posts should not be below a certain minimum.
(3) That the spacing height ratio should not exceed a certain maximum.

There are certain incidental references as to the avoidance of abrupt changes in illumination, glare, &c. For the rest the specification is concerned with the method of test of installations purporting to light within the stated classification, a matter necessarily involving some knowledge of photometric technique.

Finally, reference is made to new or modified installations drawing attention to the desirability of those submitting tenders giving other information such as light distribution curves of the fittings proposed, luminous output of the light sources, &c. No such specification can guarantee that installations fulfilling its provisions will *per se* necessarily be ideal regardless of all other circumstances. No specification in general terms for parks and pleasure grounds defining the proportion of grass to gravel paths, height of trees, area of water, would be sufficient to guarantee a satisfactory result. Neither Field Service Regulations nor the specification for a battleship will win a war, nor is the Highway Code the be all and end all of safe driving on the roads.

Properly used the street lighting specification can in my opinion be a most useful guide. Used blindly as the basis for highly competitive tender it may lead, and has led in some cases, to most unsatisfactory results.

Use and Abuse of the Specification.

Discussions regarding the street lighting specification almost inevitably turn around the illumination clauses, those discussing the matter frequently overlooking the equally important clauses referring to height of posts and spacing height ratio. These two clauses have resulted from most careful consideration of such highly complex factors as glare, which is in itself beyond precise simple definition.

It is the duty of the authority paying for the street lighting to check that it is obtaining the results for which payment is made. The method of test set out in the current specification is in foot candle measurement of illumination to guarantee that at no point in the road is the illumination less than the specified figure, subject to a certain allowance for depreciation. Indications are given as to where the minimum is likely to fall in order to assist those carrying out the tests. This has led in certain cases to abuse by designers focussing light on the theoretical test points at the expense of light falling in other portions of the road less likely to be tested. In consequence street lighting as such has suffered, since where this ill-conceived ambition has been fulfilled the nominal classification of the street at a certain grade has been maintained with the use of much less light than should properly be used and a greater tendency to glare than is desirable.

The attention of the B.S.I. Committee has been drawn to this point and it can be no secret that in a proposed revision a multiplicity of possible test points has been adopted to prevent this abuse. No final conclusion, however, has been reached as to the relative merits of central and side lighting. From the pedestrian's point of view, especially in fogs, side lighting is the more convenient and certainly has the merit of illuminating the kerb which is from the safety point of view a critical boundary line. Where the kerb remains in darkness, traffic tends to edge towards the centre of the road thus reducing the effective width of the road as a traffic route. On the other hand, central lighting from the traffic point of view has the merit of more clearly indicating the direction of the road ahead.

During the last few years there has been a greater tendency towards the adoption of increasingly powerful lamps at greater mounting height and greater spacing. In some cases such lamps are fitted with directional devices and may present a practical problem to the designer in that the main beam leaving the light source inevitably travels in straight lines, yet it is comparatively rare for the road itself to be straight, and the proper disposition of long straight beams on a winding road clearly presents difficulties. A somewhat parallel problem would be created by the construction of a long non-articulated train the value of which would obviously be extremely limited on a winding track. Were it not for considerations of cost, there is much to commend on a winding road the use of smaller sources at lower mounting heights and closer spacing.

While re-direction of light can serve a useful purpose, especially if the light would otherwise be completely wasted, the first requirement in adequate lighting is the provision of sufficient total luminous flux. The adoption of total flux per unit length of road is, however, an unsatisfactory criterion since it fails to discriminate between useful light and light comparatively useless. The difficulty will be appreciated when it is remembered that sideways lighting directed outside the street boundaries is almost completely wasted where the surroundings are trees or open fields, but is very definitely of value where the road is lined with houses adjacent to the pavement. So long as there is any uncertainty or confusion as to the objects of street lighting so long will there be various schools of thought regarding the proper type of lighting to be provided. On the Continent, for certain arterial roads, a system of lighting with sharp cut-off has found considerable favour—the lighting being directed primarily across the road from posts mounted at fairly close spacing; and demonstration lengths of road adopting this system have been erected in this country. On a smooth road surface such a system will lead to a low road surface brightness in view of the small proportion of the light directed longitudinally down the road, but where the road surface is rough a satisfactory degree of road surface brightness is achieved. It is probable that no system of lighting can be wholly independent of the character of the road surface.

The factors contributing towards visibility in the road have for some time been under intensive discussion. Essentially visibility of objects in the road depends upon the brightness contrast between the object and its background. This consideration has led to stress being laid on brightness of the road surface itself almost to the exclusion of brightness of the road boundaries, &c., which may also form the background, and also to the exclusion of consideration of the brightness of the object itself. It is said that objects must be made visible as dark silhouettes against a light background, whereas it is common experience that the visibility of objects in motor headlights generally depends upon the reverse—the objects being seen bright against a comparatively dark background. The provision, therefore, of a uniform road brightness, were it possible, would lead to a degree of visibility the reverse of that obtained by motor headlights, and observation shows that the use of headlights in streets depending upon this criterion leads, by combination of the two effects, to extremely deceptive visibility, a danger to be overcome by

lighting to such high degree that the use of headlights is automatically abolished.

The special feature of a lighting installation designed to give uniform road brightness lies in so directing the light that a proportion is distributed near the horizontal in the direction of oncoming traffic, instead of the light being focussed, if at all, on to the midspan point at greater angles to the horizontal. This carries with it a certain danger of producing glare, but this tendency is said to be counteracted by the increased brightness of the road surface itself against which obstacles can easily be seen. While this may be true on straight flat roads it soon ceases to be true in practice on roads involving bends or gradients, not only because the objects are frequently not silhouetted against the road surface as a background, but also because the design for uniform brightness on such roads presents especial difficulties. Finally, on any road a shower of rain effects a complete transformation in appearance in terms of brightness owing to the quite different reflection characteristics of any road surface in wet and dry condition.

It has been well said that the problem of street lighting is dynamic rather than static. The merits of an installation cannot fairly be judged by stationary viewing, since this tends unduly to favour the importance of uniform brightness even though it be of a very low order. The driver of a vehicle has less time for recognition of obstacles than has a stationary observer, and may well prefer a patchy brightness on the grounds that any object will sooner or later be silhouetted against a bright patch and may therefore be more positively recognized than it would be silhouetted all the time against a uniform brightness of very low degree. The very fact of the object suddenly coming into view against a pool of light is more likely to attract the driver's attention and so lead to the appropriate response than is an object continuously if somewhat indefinitely in view.

Road brightness especially depends on the character of the road surface and on the proportion of diffuse and specular reflection therefrom, and for those and other reasons forms an extremely difficult criterion for embodiment in any quantitative specification. Uniformity of surface brightness depends not only upon immediately adjacent lamps but also on lamps many spans distant. In normal winding roads these distant lamps may not be visible or effective. The changes in apparent road brightness as the observer moves his position will be familiar to you all, an effect emphasizing this road brightness to be something of an optical illusion.

The ideal specification or classification of street lighting would be one in which all the roads within any given class would be recognizably similar in appearance and visibility characteristics. To achieve such similarity would require standardization of road surface, standardization of surroundings, and standardization of colour of the objects to be seen, as well as standardization of the lighting systems themselves. Clearly these conditions are impractical and we must be content with a classification falling short of the ideal and assuming for test purposes standard conditions as regards surface to be viewed and view-points of the observer. This standardization, in effect, is that adopted in the B.S.I. Specification whereby the horizontal illumination is measured on a standard surface from a standard position. On broad lines classification can be so effected, but local circumstance requires that the experience and technical knowledge of competent lighting engineers be brought to bear if a suitable and adequate lighting installation is to be designed to suit local circumstances.

Responsibility for Street Lighting.

The specification for street lighting, like any other specification, can be a good servant but a bad master. Properly used, not as an end in itself but as a guide to the provision and maintenance of satisfactory street lighting, it leaves a large degree of responsibility for detailed planning in the hands of those using it. It is highly improbable that any street lighting specification at any future date can be drafted in such form as to be capable of blind application under practical conditions. This fact is recognized in the current specification in which guidance rather than rigid rule is given, even in respect of the test points, while little information is given as to what use should be made of the light distribution curves, &c., accompanying tender. It is possible that more explanatory matter dealing with this latter point would do something towards overcoming some of the abuses. It is, however, clear that in this highly technical task of providing street lighting installations to fulfil simultaneously a number of somewhat ill-defined purposes experience and technical competence are required on the part of those responsible.

There has recently been appointed a Committee of the Ministry of Transport, of which I have the honour to be a member, whose purpose it is to review street lighting in the broadest possible sense. It would be improper to comment in any detail on the considerations now before that Committee, but clearly this problem requires review not only of the technical aspects of the matter but of the administrative and financial control. It will be familiar that in some cases arterial roads traverse the areas of parish councils, who are responsible for the lighting but have very limited financial resources and no technical qualifications, nor can these small bodies be held morally responsible for the lighting conditions on arterial roads which quite by chance pass through their area of control and carry traffic of no concern to themselves. County councils have recently been given certain powers to deal with this difficulty, but it is early yet to say whether these powers will be of effective use.

Any considerable degree of street lighting may easily represent a cost of several hundred pounds per year per mile, or expressed as capital value about £5 per linear yd. of road. Surely an item of public service representing so great an expenditure of money deserves considerably more attention than it has received in the past? I hope that the discussion which will follow this Paper may add something of value to our knowledge on the subject in so far as the Illuminating Engineering Society is surely the body chiefly responsible for determining our technique on this subject. Can we derive and express the appropriate type and degree of street lighting for main traffic routes without forgetting the needs of the residents and of the pedestrians on the footpath? Can we derive requirements for residential roads? Can we derive requirements for outlying areas? Is it possible to imagine at some future date agreement as to lighting requirements for each of the three primary users of street lighting—the residents, the pedestrians, and the traffic—and so superimpose these several standards as to create a satisfactory installation for the particular street under review. It would thus, for instance, be common-sense on a traffic road to reinforce the side lighting if and when that traffic route was built up, and equally common-sense in a residential area to decrease the traffic lighting during such period of the night as the traffic density itself became negligible. This seems a logical way of dealing with matters but must always be complicated by the fact that roads are not themselves standard so that we have to deal with bends, junctions, gradients, refuges, varying road surfaces, while the pronounced effect of various surroundings such as trees, houses, walls, &c., have as yet scarcely been considered.

I would suggest that the written word in the form of a standard specification can never supersede the competent lighting engineer. The provision of good lighting in our streets and the proper use of the Street Lighting Specification is handicapped by the fact that there are far too few engineers who have made a special study of the art, science, and economics of street lighting.

The Municipal Year Book*

The 1935 edition of the Municipal Year Book creates a new record for the size of this standard reference book on Local Government administration. There are 1,644 pages —80 more than in the 1934 edition; and the number of separate sections has been increased from 45 to 48.

The Minister of Health again contributes a preface and the Minister of Transport a foreword to the Roads and Transport Section. The section embracing national authorities has been considerably extended. All national authorities, with the exception of Scottish and Irish, have been brought within the one section; the Scottish and Irish more appropriately come within these respective sections. An innovation has been introduced in the sections concerning the different classes of authorities. Cross references are given to the principal statutory provisions and legal decisions of 1934 as they affect each type of authority. Much of the descriptive material concerning local authorities has been re-written. As a result of the reviews of county districts, extensive changes have taken place in urban and rural districts, and these have been noted.

About eighty pages are devoted to the Education administration—thirty more than in the 1934 edition. A new section is devoted to rating and valuation. Among other additions are: Names and addresses of public analysts in England and Wales; names and addresses of coroners; extended list of British Standard Specifications; and a list of institutions appropriated in pursuance of the Local Government Act, 1929.

All the outstanding statutes passed in 1933-34 affecting Local Government, as well as Statutory Rules and Orders, are surveyed in the Legislation section, while a comprehensive review is given of leading law cases of the past year.

* "Municipal Year Book, 1935." Published by the Municipal Journal, Ltd., 3 and 4, Clement's Inn, Strand, London, W.C. 2; 30s. net; 1,644 pp.

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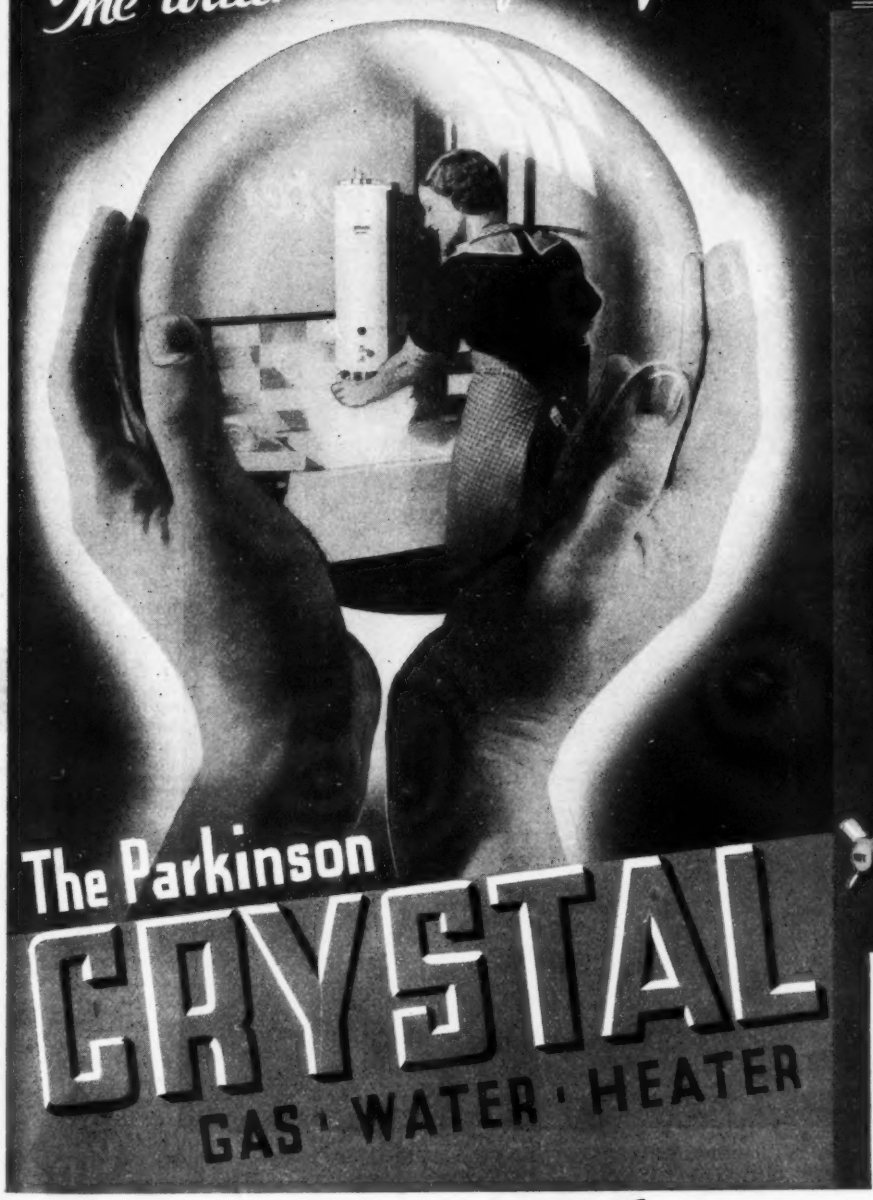

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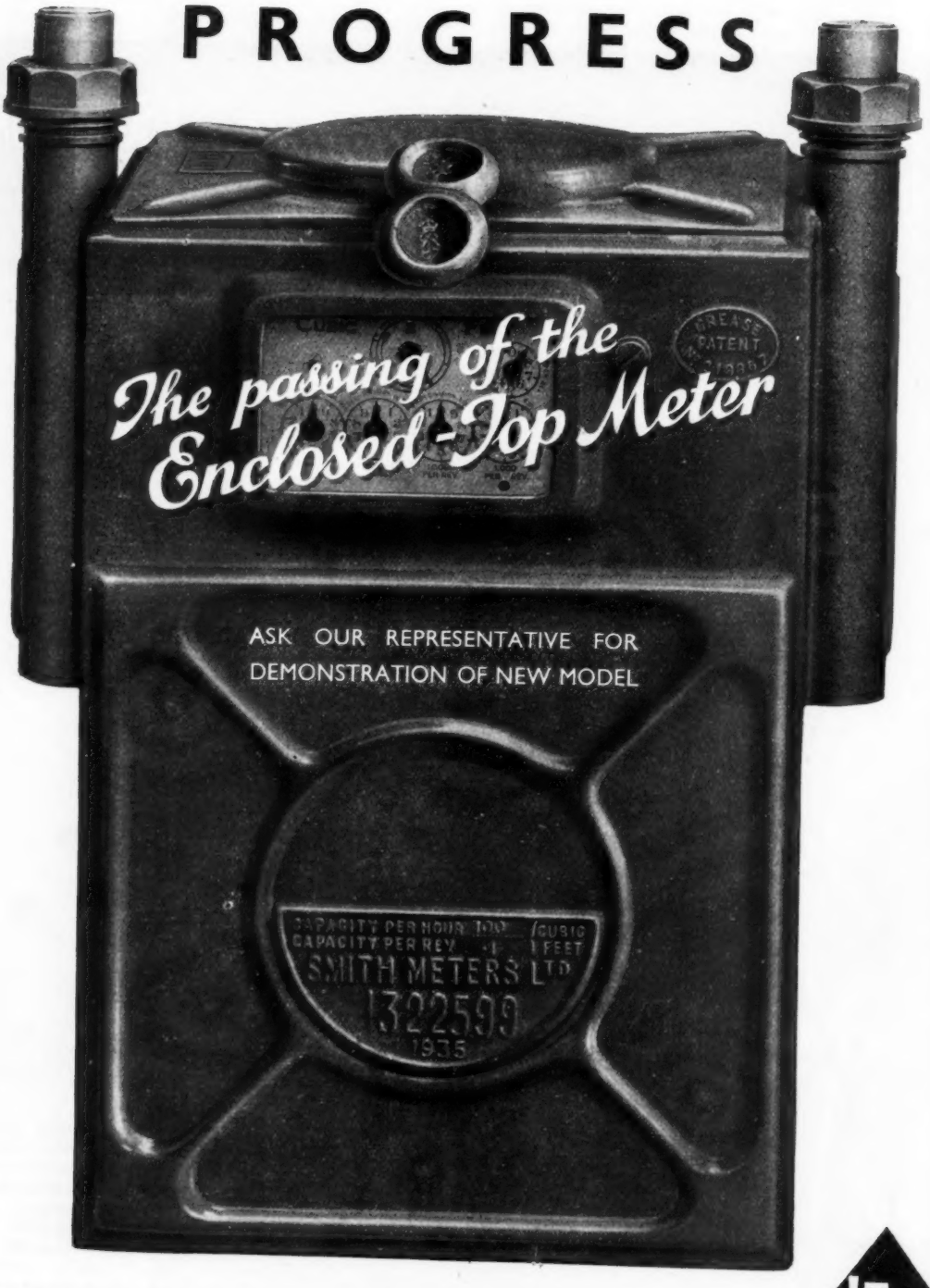

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Severn Valley Gas Corporation

Annual General Meeting

Satisfactory Initial Results

The Annual General Meeting of the Severn Valley Gas Corporation was held on Monday at the registered office, Cheltenham. Major JULIAN DAY, M.C. (the Chairman), presided.

THE CHAIRMAN'S ADDRESS.

The CHAIRMAN said: Turning first to the balance-sheet, on the debit side you will observe that of the authorized capital of £1,000,000 there has been issued £672,720. The 100,000 deferred shares were issued for cash at par. Of the preference shares 100,000 were issued for cash at prices not less than 22s. per share. Of the ordinary shares 150,000 were issued for cash at not less than 22s. per share. Thus the premiums on the preference and ordinary shares issued for cash amounted to slightly more than £25,000. The remaining 202,781 preference shares and 119,939 ordinary shares were issued to holders of the various investments acquired, who elected to take shares in this Corporation rather than cash. The amount credited to share premium account in connection with these issues is based on the value attached to the shares in comparison with the cash prices of the respective offers.

Share Premium Account.

Thus the next item, share premium account, amounts to a total of £53,115, the average premium being nearly 10% on the 572,720 issued preference and ordinary shares combined.

The amount standing to the credit of share premium account has been applied first to writing off formation and other expenses of £13,352, and, secondly, to writing off the sum of £33,332 paid in respect of Directors' compensations for loss of office, this being expenditure which does not strictly form part of the cost of the investments purchased. The balance of £6,430 has been applied to writing down the investments by nearly the total amount paid as purchase commission—that is to say, the expenses attached to the negotiation and carrying through of the transactions leading to the acquisition of our investments.

Investments in Subsidiary Companies.

On the assets side of the balance-sheet, investments in subsidiary companies stand at £711,875, and in brackets it is shown that £41,561 of this amount includes the incidental expenses and also the compensations referred to. Thus the amount available in share premium account—namely, £39,763—has extinguished very nearly the whole amount expended in excess of actual purchase consideration. After such writing down the investments stand at £672,111. There was owing from subsidiary companies on current account the sum of £1,589. These are merely current balances. There are no loans to subsidiary companies, for, as a result of arrangements made by the Corporation, these companies obtain their funds at very reasonable rates of interest direct from their bankers. The next two items, loans at call, £12,816, and cash at bank and in hand, £1,381, a total of £14,197, show the total cash resources immediately available.

Formation and other expenses, as already stated, have been entirely written off. It will be observed that no commissions or similar promotion expenses were paid at the outset.

Revenue and Appropriations.

If you will now turn to the revenue account, on the credit side, the amount received from dividends on investments (after deduction of tax), Directors' fees, &c., is £21,036. Directors' fees alone amounted to approximately £1,800, but this is for a broken period. The total amount to be anticipated from Directors' fees of subsidiary companies payable to the Corporation for a complete year from the present group of companies amounts to more than £4,000, and thus it will be seen that the amount paid as compensation to retiring Directors, although it has been wholly written off, if regarded as an investment, produces a substantial return on the amount expended.

The appropriation account shows how the balance of £16,643 brought from revenue account has been utilized. The preference dividend for the year, after deduction of tax, called for £6,753. The interim dividend on the ordinary shares for the half-year ended Sept. 30 last, after deduction of tax, required £847 only, as the then issued ordinary shares had not been outstanding for long. Thus the balance available, subject to the dividends on the ordinary and deferred shares, which the Directors have recommended to be paid, amounts to £9,042.

Dividends.

In recommending dividends at the rate of 5% per annum on both the ordinary and deferred shares, the Directors have done so in the belief that these can be comfortably maintained. After paying the dividends recommended, the amount carried forward for next year will be £2,022.

The Corporation is based on the three contiguous Companies at Cheltenham, Gloucester, and Stroud. The value of our investment in these three Companies represents 88% of the total amount invested up to date, and about seven-eighths of our revenue from investments accrues from dividends paid on the shares of these Companies. It would, I think, be difficult to find in the United Kingdom three contiguous companies of similar size with more enviable records. All three operate under orders permitting the payment of maximum dividends at the rate of 5% per annum on their respective ordinary stocks, and these maximum dividends have been paid by these three Companies over a period of more than 50 years. The Gloucester Company has paid its 5% maximum dividend each year consecutively without a break since 1856, nearly fourscore years. Our investment income, being based so largely on the maintenance of these dividends, may be regarded as well assured.

Increased Number of Consumers.

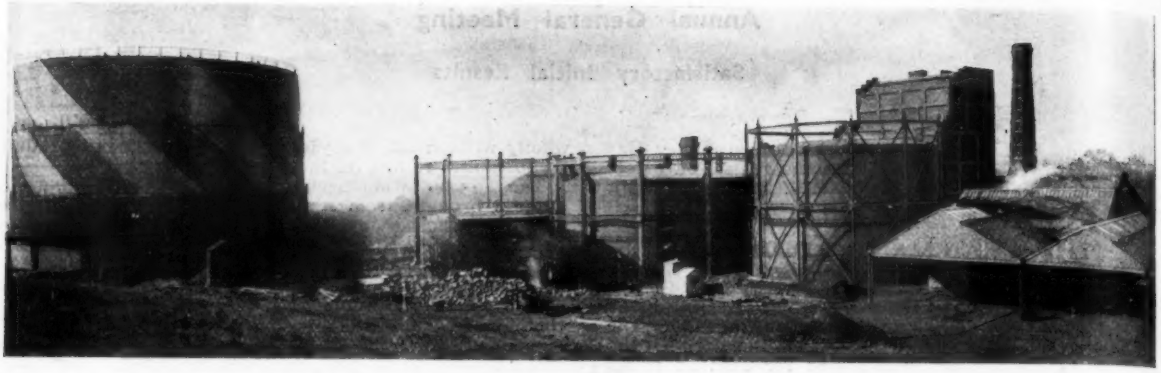
It is gratifying to note that in the calendar year 1934, in spite of conditions unfavourable to expanding sales of gas, each one of these Companies shows an increase in the amount of gas sold as compared with the calendar year 1933. Each Undertaking has increased the number of its consumers, and each has shown substantial increases in the sales of appliances. The growth of these Companies has been consistent, and I may allude to the fact that in the last four years the output of gas of the Cheltenham Company has increased from 580,000,000 cu.ft. to 629,000,000 cu.ft. per annum.

After referring in detail to the smaller companies in the group, the Chairman continued: The Corporation has been established on a strong base, and its activities have been well launched. We have faith in the strength of the Gas Industry and in its continued growth and prosperity. We believe that its best interests demand a progressive policy of expansion both in the domestic and the industrial field. The former will be aided by supplying to consumers at the lowest possible terms, whether by means of hire purchase or otherwise, all those modern appliances which were unused if not undreamed of a decade or so ago. Where the cost of gas is relatively high, it can be reduced by the adoption of the best technical methods of production and distribution as well as through economies effected in purchases, and industrial uses can undoubtedly be encouraged by price reductions and the introduction of more attractive tariffs. Unlike the domestic heating load, industrial consumption is relatively independent of weather conditions, and I do not think that its possibilities are by any means fully realized.

We look forward to the growth of the Corporation in this general area, and believe that as time goes on it can be more and more definitely established that inclusion in this group will prove of definite advantage to individual statutory undertakings and to their consumers.

The report and accounts were unanimously adopted.

INAUGURATION OF
Glover-West Verticals at Yeadon



A General View of the Gas-Works, showing the New Carbonizing Plant on the right, the formal inauguration of which took place at the works of the Yeadon and Guiseley Gas Company, Henshaw, on Wednesday, April 10, the ceremony being followed by luncheon at Yeadon Town Hall.

Many distinguished visitors, including the Chairmen, members, and officials of the Urban Councils of Yeadon, Guiseley, and Rawdon, the Parish Council of Menston, and leading figures in the Gas Industry in the North of England, watched Major Geoffrey H. Kitson (President of the Leeds Chamber of Commerce, and Deputy-Chairman of the National Gas Council) perform the inauguration ceremony. This took place on the ground floor of the new retort house. Subsequently, the visitors were taken on a tour of inspection of the plant.

In the absence of Mr. Thomas Parsons (Chairman of the Company), who is ill, Mr. ROBERT W. WATKINSON (the Deputy-Chairman) presided at the luncheon.

Gas Industry.

Major KITSON, proposing the toast of "The Gas Industry," coupled with that of the "Yeadon and Guiseley Gas Company," said it was not always realized that celebrations of the kind they were enjoying that day as the guests of the Yeadon and Guiseley Gas Company were of real service to the Gas Industry as a whole. Major Kitson commented on the expert work of manufacturers of gas plant in Yorkshire and other districts, and added that in going round the works of the Yeadon and Guiseley Gas Company they had been able to see something of the up-to-date developments in the Gas Industry. "I would like to congratulate the management, and the entire staff, on the plant we have had the opportunity of inspecting to-day," he concluded.

Tribute to Mr. Cooper.

Mr. CHARLES S. SHAPLEY, on behalf of the Gas Industry, and Mr. R. W. WATKINSON, on behalf of the Company, responded.

Mr. SHAPLEY paid tribute to the work of Mr. J. E. Lister Cooper, Secretary and Manager of the Company, as Secretary of the Yorkshire Commercial Section, and went on to say that the Gas Industry was a very live Industry indeed. If everybody were to become disciples of smokeless fuel, gas would become so cheap that the price would not enter into the question.

Alderman F. J. WEST, J.P., proposed the toast of the towns and Councils of Yeadon, Guiseley, Menston, and Rawdon, and said that the presence at the luncheon of so many representatives of the Councils of the four townships indicated the warm appreciation of the Company's undertaking and the good feeling that existed between them.

Forefront of Industry.

Dr. M. J. BETT, Chairman of Yeadon Urban District Council, responding to the toast, said that the production of smokeless fuel in itself was a boon to the public in the prevention of the spread of disease.

Mr. J. E. LISTER COOPER proposed the toast of "The Visitors." The chief aim of the Gas Industry was consideration of the needs of the consumers. Gas would be the domestic and industrial fuel of the future, and in making that claim he was not expressing any pious platitude. In most of the up-to-date housing estates that were being built gas was being installed for cooking and heating.

Mr. A. L. JENNINGS (Spenborough) and Mr. E. H. HUDSON (Normanton) responded.

The District Served.

The district served by the Yeadon and Guiseley Gas Company includes the wool towns of Yeadon and Guiseley, a portion of the townships of Rawdon and Menston-in-Wharfedale, and the village of Hawksworth, the whole lying within ten miles of Leeds and Bradford to the north of a line drawn between these two cities.

Yeadon itself is a manufacturing town of some 8,000 inhabitants, and is situated eight miles north-west of Leeds. To-day it is developing as a residential town, accommodating business people from Leeds and Bradford.

Guiseley is also a woollen manufacturing town, of about 6,000 inhabitants. Guiseley and the neighbouring districts are also developing as a residential place.

The Company also supplies gas to a portion of the township of Rawdon, a residential town of about 4,800 inhabitants.

Menston-in-Wharfedale is a residential district, and has a population of about 4,400.

Finally, last year the Company extended its mains a distance of 1½ miles to the village of Hawksworth.

The New Plant.

Early in 1933 the Directors of the Company were faced with the question of renewals of carbonizing plant. It was found that the cost of re-building and re-modelling the existing horizontal retort plant, which had been in use for 20 years, would be prohibitive, having regard particularly to the comparatively small improvement which could be effected.

In such a situation as that occupied by these works it was essential that the new plant should remove the reproach of the smoke nuisance inseparable from the older type of carbonizing plant. It was therefore decided to erect an installation of continuous vertical retorts, with coke-storage bunkers and grading plant. The project was accelerated by a year or two on account of the exceptionally favourable prices ruling in the engineering industry, and after due consideration had been given to a number of propositions it was decided, in December, 1933, to adopt the Glover-West system.

The new carbonizing plant comprises 8 Glover-West continuous vertical retorts of the "Steaming Model," elliptical in section, measuring 56 in. in the major axis at the bottom of the retort proper and tapering to 50 in. at the top. The details of the setting follow the standard Glover-West design with horizontal combustion chambers with independent nostrils, so that the temperatures of the several zones of the retort are graduated according to requirements.

The first month's operation of the plant under normal conditions proved that the guaranteed results were being exceeded. The gas made per ton was over 17,000 cu.ft. at a calorific value of 500 B.Th.U. per cu.ft., while the capacity of the plant was fully realized.

Coal is brought to the retort house in road vehicles, which are discharged into a receiving hopper of 10 tons capacity. The coal is delivered to a band conveyor which, in turn, delivers it to the bottom strand of a gravity bucket conveyor encircling the retort bench. The last-named conveyor is of the West lip-bucket type, and is capable of handling 40 tons of broken coal, or 18 tons of coke, per hour. This conveyor elevates coal to overhead coal-storage bunkers at 48 hours' capacity, and it receives coke as discharged from the retorts and elevates and conveys it to

the coke-storage hoppers placed at the end of the retort house.

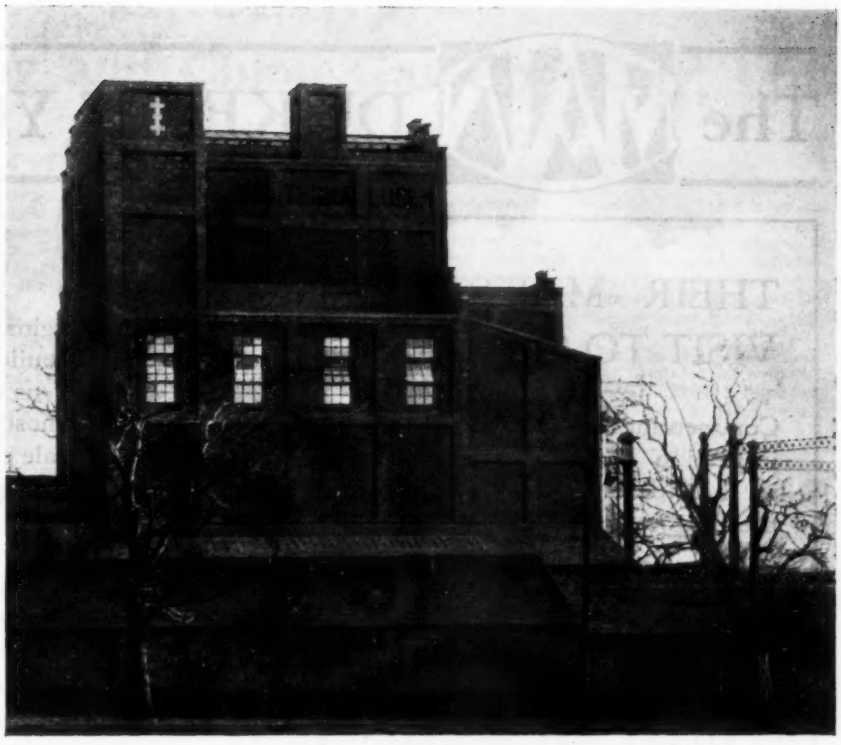
The conveyor is of the West automatically forced-lubricated design. The West renewable-bush chain owes its durability to the fact that there is no wear and tear on the links themselves. The automatic forced lubricator operated by the conveyor chain ensures constant and efficient lubrication of the wearing parts of the chain. The design of the chain is such that the lubricant is forced into the working parts and flows outwards, washing any dirt or grit before it.

The coke-storage hoppers are of the steel-framed brick-panelled design, with a total capacity of 150 tons, divided into four main compartments for the several sizes of coke. The coke is graded into these sizes by a West patent noiseless, balanced, suspended reciprocating grader. Separate compartments are also provided for the supply of coke for the producers and for filling the retorts after scurfing. Coke is conveyed to the several points from these compartments in skips running upon suitably disposed monorails. Bag-filling chutes and bagging apparatus are provided for the smaller sizes of coke.

The waste gases from the setting are led from the top of the retort settings through heavily insulated flues to the boiler, with an alternative route to a brick-lined steel chimney, so that the settings may operate either under induced draught through the oiler or natural draught through the chimney. The boiler is of the Spencer-Bonecourt fire-tube type. It is rated at 3,000 lbs. of steam per hour, from and at 100° C., and a working pressure of 120 lbs. per sq. in. A recent test showed that 2,720 lbs. of steam per hour at a pressure of 90 lbs. per sq. in. was being raised.

The fan unit consists of a high efficiency Sirocco fan with water-cooled bearings, direct coupled to a Crompton-Parkinson electric motor, capable of developing 9¼ H.P. The power developed during the test referred to above was 7·4 H.P., and the fan unit as a whole is capable of dealing with a 20% continuous volumetric overload. In order to maintain a supply of steam when the retort bench is operating at reduced loads, provision is made for by-passing a portion of the fuel gas direct to the waste gas flue, where it is consumed, the products of combustion passing direct to the boiler. The waste-heat recovery plant is completely automatic in action, beng controlled by a "Thermofeed" feed-regulator with "Hilo" alarm.

Electrical power for the whole installation is generated in dynamos direct-coupled to Sisson high-speed engines enclosed in the engine house, which also contains the extractor driving gear. In the same house accommodation is provided for the main switchboard and for the distribution board with the controls of the several motors of the complete installation.



The New Glover-West Retort House.

"World Survey"

It has for long been a commonplace that the future progress of society depends, paradoxically enough, on those whose successful work has in recent decades done so much to disturb its equilibrium—namely, the technical workers. It is therefore significant that the World Power Conference, a mainly technical international organization, should sponsor the publication of a journal devoted to economic affairs. Where economists have failed to agree perhaps the technical experts may be able to suggest more rational methods of dealing with the complexities of the modern economic situation.

World Survey, published under the auspices of the World Power Conference on April 15 (5s. net), certainly fulfils these expectations by the quality of its articles and the breadth of its economic survey. In both, the treatment is fresh and constructive and the information reliable and up to date.

In a series of stimulating articles various problems in the economic sphere are handled from different points of view although the unity of treatment is remarkably well maintained. The economic problems arising from the application of power to industry on a modern scale constitute the central theme. Mr. D. N. Dunlop, O.B.E., in an article notable for the clarity with which fundamental issues are discussed, poses the central problem with a contrast between the rapidity of industrial and technical advance and the rate at which our economic structure is adapted. There can be no doubt that his proposals—which *World Survey* is in part intended to implement—would be of the greatest value to-day if they were generally adopted. Further articles deal with technological unemployment, with the question of surplus commodity stocks, and Professor Enström, the international authority on electricity production, contributes an article on the future of power supply.

The Economic Section is planned to present world economic trends by means of numerous index numbers. These are easy to use and greatly facilitate comparisons between different periods and different aspects of economic activity. The articles accompanying these indices are intended to elucidate the present position and indicate the likely trend of events in the future. A special article on Belgium discusses the probable repercussions of devaluation on other countries.

The "plan" of *World Survey* may sound ambitious—especially for an organization not specifically concerned with economic affairs—but the treatment of these questions involves more perhaps than economics alone, and *World Survey* is a really important effort to bring more than economics to the study of these problems. That the results will be of value is convincingly shown by this first number. It will do much to promote the understanding of industrial and economic problems; its emphasis on the world unity in economic affairs is a welcome contrast to the stultifying views now current, and the reasonableness of its attitude carries conviction. *World Survey* meets a need of great urgency, and it is to be hoped that this venture will be strongly supported by all who are concerned to secure a better ordering of our economic life.

The MAIN DUKE OF YORK Range

THEIR MAJESTIES' VISIT TO OLYMPIA

Commenting on Their Majesties' inspection of the King's House at the Ideal Home Exhibition, the Press report read:—

"'The King had a long talk about the relative merits of gas and electricity for cooking. His Majesty showed that he knew all about the advantages of both methods,' an official of the Warrant Holders' Association said.

"In the house the main cooking is done by gas . . . . ."

The King's knowledge of the advantages of Cooking by Gas will probably extend to the time when, over 30 years ago, Their Majesties (then Duke and Duchess of York) went into residence at York House. The kitchen was fitted with a Gas Cooker—the first model of the now well-known Main "Duke of York" Range.

An original type of Gas Range built with independent ovens of a size proved to be most convenient for large-scale cooking.

For large families, or in a boarding house, one of the pair shown will be found suitable, or any number of these ovens may be built together to form an extended range with continuous hotplate.

Every possible requirement in large-scale cooking can be satisfactorily met by one or other combinations of "Duke of York" ovens and hotplates.

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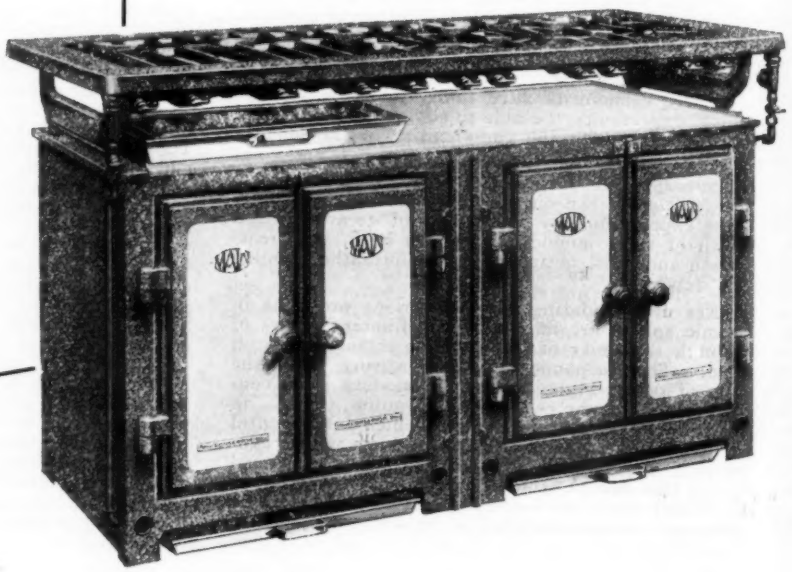


One of the latest models of the Double oven "Duke of York" Range is illustrated on this page.

The Hong Kong and China Gas Company, Ltd.

Report of Proceedings

The Annual General Meeting of the Shareholders of the Hong Kong and China Gas Company, Ltd., was held at the Company's Offices, 148, Gresham House, Old Broad Street, E.C., on Thursday, 4th April, 1935—Mr. ROBERT H. GLEN, F.C.A. (Chairman), presiding.

The SECRETARY (Mr. S. F. Field) read the notice convening the Meeting and the Auditors' Report.

The CHAIRMAN: Gentlemen, A copy of the Report and Statement of Accounts having been sent to each Shareholder, I would ask you to take the same as read.

It is a matter of regret to the Board to be without the presence of one of our Directors, Mr. H. Royston Askew, who has at the last moment been prevented from attending.

I should like, before actually dealing with the Accounts now before the Meeting, to make a somewhat brief statement dealing with general conditions experienced in Hong Kong and Kowloon and the difficulties this Company has been faced with during the year 1934.

The Colony has and is experiencing, what is, I may term, an unprecedented trade depression with the natural result that all businesses are faced with difficult trading. Coupled with this the imposition of heavy duties by the Chinese Government in Canton on all imports has prevented certain Manufacturers in Hong Kong from carrying on business at all and these were forced to close down. To give you an instance, one large consumer who, unfortunately for the Company, had to give up business for this one reason used to consume at Kowloon more gas per annum than our total recorded decrease at Kowloon for the whole of the year.

It will also be appreciated that under prevailing conditions all Hotels and Restaurants are doing considerably less trade.

In addition to the foregoing difficulties the Company had the unfortunate experience of having a serious accident to our largest Gasholder, a Holder of 500,000 cu.ft. capacity. This accident, for which no satisfactory explanation or reason has been discovered, occurred on the 14th May, 1934, the Gasholder collapsed with the result that the Company lost the whole of their main storage. Our Manager and other European Engineers were on the spot immediately and I am pleased to record they suffered no injury.

By the prompt action taken by Mr. H. E. Stone, our Manager, the supply of Gas was completely resumed within two hours of the accident and I feel we should congratulate our Engineers and Staff in Hong Kong upon this fine performance.

After I have dealt with the Accounts I propose to let you know the steps taken by your Directors to minimize the risk of any similar accident occurring in the future.

I will now turn to the Accounts and deal firstly with the Revenue Account.

The Sales of Gas at both Hong Kong and Kowloon show a decrease on the year's working: at Hong Kong 9,213,600 cu.ft. or 5 per cent. less Gas was consumed and at Kowloon the lower consumption was 6,341,000 cu.ft. or 7·61 per cent. less—my foregoing remarks, I think, briefly explain the reason for this.

The cost for Coal Carbonized is $199,964 or $17,238 less than for year 1933, being mostly due to a more favourable Coal Contract, the quantity used also being slightly less than the preceding year.

The cost of Carburetted Water Gas Manufacture is about the same as for the previous year, the actual figures being $18,534 as compared with $18,408.

Working Expenses are slightly more, the increase being $3,611: during the year a further Junior Gas Assistant was sent out to Hong Kong.

The cost of Maintenance of Retorts is lower by $8,175, but the cost of maintaining our Mains and Works is more than for the preceding year by $13,692.

Our Bad Debts amount to only $2,788 and although this figure is higher than for 1933 by $718, your Board consider the Company has done well under this heading in view of the very trying conditions.

Publicity Account is higher by $854.

Obsolete Fittings written off is $10,174 lower. A further quantity of old Gas Cookers have been written off during the year.

Bonus to Staff and Workmen shows a decrease of $3,360. The lesser dollar profit shown in the Accounts is the reason for this.

Depreciation of Meters, Stoves, &c., on Hire at $31,697 is lower by $7,502.

On the credit side a decrease is shown in Gas Rentals of $45,008. This is, of course, entirely due to the less quantity of Gas Sold during the year.

There is an increase in Meters and Fittings Rentals, the figures being, 1934, $86,596 as compared with $84,390 for the year 1933.

The Revenue from Residuals is $126,568, which is $13,237 lower than previously.

Coke Sales have varied throughout the year but during the last few months of 1934, our Manager reports, the demand exceeded the supply.

Our sales of Tar, although somewhat lower than previously, give no cause for anxiety. We have successfully developed new business with the Government in prepared Tar for use on the roads and during the year 21,000 gallons were sold for this purpose. A continuous type of Dehydrator has been constructed in Hong Kong, so that we shall now be able to handle sufficient Tar to cover any future requirements for road purposes.

The number of Public Lamps fixed as at 31st December last was 2,574, an increase of 13 over the number fixed at 31st December, 1933.

It gives me pleasure to state that the Company has secured the renewal of the Government Lighting Contract for a further period of five years as from 1st July next. This, I think you will agree, is most satisfactory and illustrates the efficient way in which this section of our business is carried out.

As regards the London Revenue Account, you will notice a sum of £42 5s. is charged for Provident Fund for London Staff. Until the 1st January, 1934, a lump sum was paid to the Secretary here to cover the London Expenses. The Directors decided that the time had arrived when the Company should have its own Staff in London and arranged to take over certain Members as from 1st January, 1934.

Having completed this it was considered the London Staff should be given the same privileges as existed for our Hong Kong Members and I feel sure, Gentlemen, you will quite agree that a Fund of this description encourages thrift amongst its members.

I am pleased to say that the profit shown in the London Revenue Account is £23,968 19s. 9d., or an increase of £1,927 5s. 8d. over 1933. Although the dollar profit is somewhat less than last year the higher Exchange Rate ruling throughout 1934 has materially assisted the Company to show the increased sterling profit.

Dealing now with the General Balance Sheet, you will notice that our Loan from the Hong Kong Bankers at 31st December last stands at £17,441 8s. 5d. This heavy loan is on account of the development of the New Kowloon Works, to which I referred at the last General Meeting. It may interest you to know that good progress has been made in developing this site; a sea wall has been completed and most of the filling and levelling is now finished. In addition, foundations for two Gasholders have been prepared and on one foundation a gasholder of half-a-million cu.ft. capacity was practically erected at end of 1934. This Gasholder was actually in commission the early part of March this year. Other works are now in hand including new Tar and Water Wells.

Our Investments in London have been reduced from £29,207 12s. 9d. to £9,744 18s. 2d., although the market value at 31st December last was much higher than this latter figure. The Company required money to meet a portion of the heavy capital outlay and your Board considered it advantageous to the Company to liquidate a portion of its Investments instead of borrowing from its Bankers at a higher rate of interest than the Investments were producing.

The question of finance to meet the future cost of the New Kowloon Works has, for some time, been engaging the attention of your Board, and after very careful consideration it has been decided at some later date this year to make a new Debenture issue: the amount of the issue and rate of interest for same have not yet been finally decided upon.

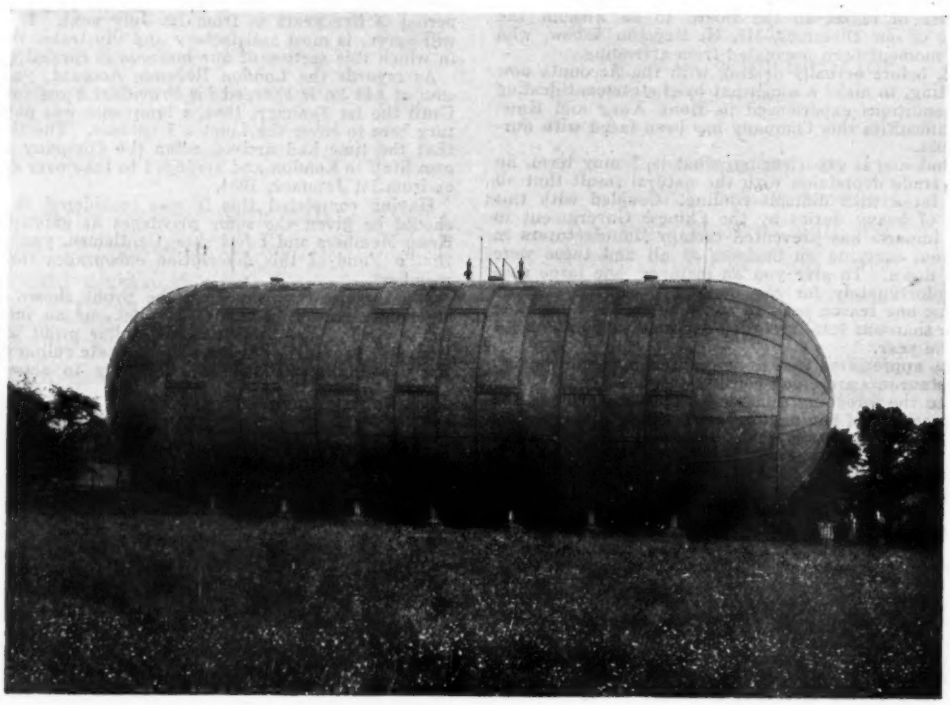
The last item in the Accounts that I need draw your attention to is the Gasholder Suspense Account £6,429 6s. 6d. I have already referred to the accident to our half-a-million cu.ft. gasholder at Hong Kong and this sum represents the total cost to the Company as at 31st December last. Rightly or wrongly the cause of this unfortunate accident is attributed by our Manager to a missile having penetrated our Holder from an outside source, although the verdict at the Enquiry attributed the cause of the accident to an escape of Gas due to the failure of the side sheeting. The side sheeting was found to be internally badly corroded.

During the Autumn of last year I personally visited Hong Kong and spent much time in interviewing Government Officials on the question of the re-erection of our Gasholder. Since the Holder was originally erected in the year 1910 many buildings of a tenement nature have been put up close to where it stood and it was considered by the Government and Public Officials that it would be most inadvisable for the Holder to be re-erected on the existing site; after much negotiating an alternate site was offered us by the Government. I was able to conclude arrangements whereby the Company acquired the new site at Kennedy Town on favourable terms—this site is away from any tenement or other buildings. The land is now in our possession and work on the re-erection of the Gasholder is taking place.

In view of the very difficult trading in the Colony throughout the year, your Directors feel that the Accounts as now before the Meeting can be regarded as very satisfactory. The Colony has in the past rapidly recovered from slumps which have taken place and it is to be hoped that the present depressed state of affairs will shortly show signs of giving way to more favourable conditions.

I now have much pleasure in moving that the Report and Accounts be received and adopted.

HIGH PRESSURE GASHOLDERS



High Pressure Gasholder 250,000 cubic feet effective capacity 32′ 0″ dia. × 102′ 0″ long, 50 lbs. per square inch working pressure, manufactured and erected for Skipton Urban District Council Gas Department.

THE FOLLOWING ARE SOME OF THE ADVANTAGES OF HIGH PRESSURE HOLDERS:—

1. Lower cost of foundations.
2. Less ground space required.
3. Unobtrusive in landscape. Easily hidden by trees.
4. No moving parts.
5. No liquid seals.
6. Dry gas.
7. Reduced cost of painting.
8. Less surface exposed to corrosion.
9. Specially useful for District purposes where the provision of High Pressure Holders at advantageous positions tends to smooth out the load curve at the works to a constant demand, enabling regularity of working to be maintained at the Works. Smaller mains are required than with low pressure holders, with reduced cost of mains and mainlaying.

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Mr. ALEX. A. JOHNSTON seconded the Resolution.

One or two questions put to the Chairman by Mr. R. M. Long having been replied to, the Resolution was carried unanimously.

The CHAIRMAN then moved the following Resolution:—

"That a Dividend on the Company's Capital at the rate of 8 per cent. per annum, subject to Income Tax, be declared for the year ended 31st December, 1934, less 4 per cent. Interim Dividend paid 10th October, 1934, the Warrants to be made payable on the 10th April, 1935,"

which was seconded by Major HERIOT R. GLEN and unanimously carried.

The re-election of Mr. Robert H. Glen as a Director was proposed by Mr. ALEX. A. JOHNSTON who said: "Mr. Glen is doing invaluable work for the Company and I do not think at a juncture like this we could have a better man in the Chair. Assiduous in his care of the Company's interests he has been out to Hong Kong in connection with our recent trouble and I think we can congratulate ourselves on having a Chairman such as he has proved himself to be."

Mr. R. M. LONG seconded the proposition which was carried unanimously.

Mr. ROBERT H. GLEN replying, said he worked hard for the Company but liked doing so as he is so deeply interested in Gas.

Mr. R. M. LONG proposed the re-election of Messrs. Cash, Stone & Co., as Auditors for the ensuing year at the usual fee, which was seconded by Major HERIOT R. GLEN and unanimously carried.

The CHAIRMAN then moved a vote of thanks to the Staff in Hong Kong and London. Referring to Hong Kong, he said that every year they could say the Staff worked well for us but last year it was very much so. They have been forced to work under very trying conditions and at the time of the accident things were attended to so efficiently that the supply of Gas was resumed in two hours. This was a surprising achievement of which all could feel very proud. They would not have such good figures to show if it was not for these keen officials.

As regards the London Staff, formerly only the Secretary was a member of the Staff, but now all those in the Office were members and shared in the bonus, &c., on the same lines as the Hong Kong Staff. They could not have a smaller or more energetic Staff. There were not any idle persons in that Office, and he did not know any other Gas Company's Office that worked more efficiently than the Secretary and the Staff in London.

Mr. ALEX. A. JOHNSTON, in seconding, said that, as an Engineer, he could realize what the accident had meant to the Hong Kong Staff, and he thought their work was wonderful.

The Resolution was carried unanimously.

A vote of thanks was proposed by Mr. R. M. LONG to the Chairman and Directors for the good work they performed on the Shareholders' behalf.

The CHAIRMAN briefly responded, and the proceedings then terminated.

Legal Intelligence

Duffield Coal Products, Ltd.

Winding-up Petition Dismissed.

A petition for the compulsory winding-up of Duffield Coal Products, Ltd., was made before Mr. Justice Bennett in the Chancery Division (Companies' Court) last week.

Mr. Charles Kinross, banker, of New Broad Street, E.C., supporting the petition on behalf of a number of preference and ordinary shareholders, asserted that the Company had not been successful, that its substratum had gone, and that a continuance of operations would involve unnecessary expenditure.

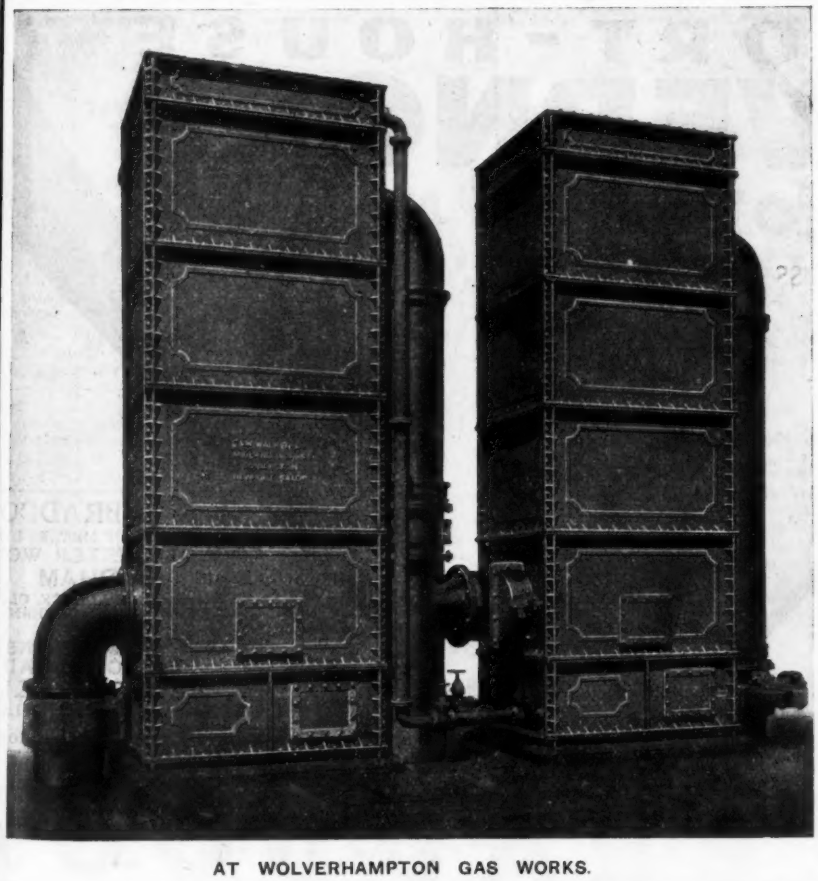
Mr. Duffield, opposing the petition on behalf of the Company, three preference shareholders, and the majority of ordinary shareholders, denied that the substratum had gone and stated that the outlook of the Company was now bright. It was certain, he added, that their method of extracting gas and oil from coal slack would be carried out on a commercial scale.

After hearing further argument, His Lordship dismissed the petition, holding that the Company's substratum had not gone as had been suggested by the petitioners.

Gas Undertakings' Results for 1934

Watchet and Williton.

A net increase of profits for the past year as against the previous year of £142, was announced at the annual meeting of Watchet and Williton Gas Light and Coke Company, Ltd. Profits for the past year amounted to £1,258. A dividend of 8%, free of tax, was declared, and a balance of £2,344 carried forward to reserve. The Directors announced with regret the death of the Chairman, Mr. A. G. Copp. Mr. T. W. Hann, of Williton, was elected to fill the vacancy on the board.



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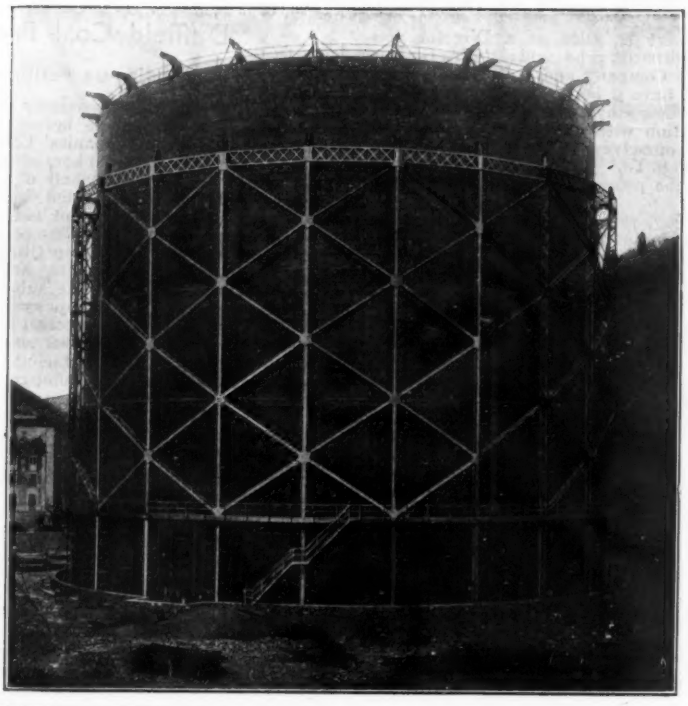

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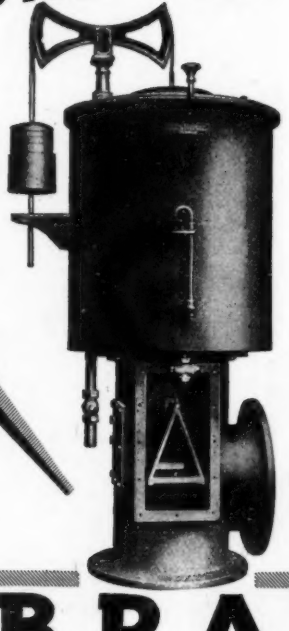

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Gas Markets and Manufactures

Stock Market Report

(For Stock and Share List, see later page)

Conditions on the Stock Exchange last week were distinctly brighter. The International situation, for the time being at any rate, was relegated to the background, and more interest centred round affairs at home. There were several factors responsible for this, the chief being the anticipated encouraging Budget statement, further good trade reports, and the satisfactory reduction in Unemployment figures. The volume of business, however, was not particularly heavy and prices fluctuated, though the general tendency was upwards. Many investors are still curtailing their commitments, while holders are loth to part with their securities, with the result that prices have been responding rapidly to any small buying or selling movement.

The general position was reflected in the Gas Market, for though business was not on a large scale many transactions were recorded at higher prices than a week ago, and the quotations of several leading stocks were marked up. There was a good demand for Gas Light units, and the price rose 9d. to 26s. 3d., the yield at this price working out at a little over 4¼%, which for the security offered presents a good opportunity to the permanent investor. South Metropolitan ordinary went ahead, the increase in this case being 5 points to 127½, giving a return of 4½% on the basis of last year's dividend of 5¾%. Imperial Continental also received good support and the price rose 2 to 207; Swansea 5½% preference hardened 2 to 117½; while, on the local Exchange, Sheffield consolidated gained 1 to 142, at which price the yield is £4 4s. 6d.%, the lower return in this case being attributable doubtless to a large local demand for the Company's stock.

Current Sales of Gas Products

The London Market for Tar Products.

LONDON, *April* 15.

There are no changes to report in the prices of tar products, which remain as follows:

Pitch, about 40s. per ton, f.o.b.

Creosote, 5½d.

Refined tar, 4d. per gallon in bulk at makers' works.

Pure toluole, 2s. 1d. to 2s. 3d.; pure benzole, 1s. 7d. to 1s. 8d.; 95/160 solvent naphtha, 1s. 5d.; and 90/160 pyridine about 5s. 9d. —all per gallon naked at makers' works.

Tar Products in the Provinces.

April 15.

The average prices of gas-works products during the week were: Gas-works tar, 20s. to 25s. Pitch—East Coast, 39s. to 41s. f.o.b. West Coast—Manchester, Liverpool, Clyde, 39s. to 41s.* Toluole, naked, North, 1s. 8d. to 1s. 9d. Coal-tar crude naphtha, in bulk, North, 6½d. to 6¾d. Solvent naphtha, naked, North, 1s. 4½d. to 1s. 4¾d. Heavy naphtha, North, 9¾d. to 10¾d. Creosote, *ex* works, in bulk, North, liquid and salty, 4½d. to 4⅝d.; low gravity, 4½d. to 4⅝d.; Scotland, 4½d. to 4⅝d. Heavy oils, in bulk, North, 4d. to 4½d. Carbolic acid, 60's, 2s. to 2s. 1d. Naphthalene, £10 to £11. Salts, 55s. to 75s., bags included. Anthracene, "A" quality, 2½d. to 3d. per minimum 40%, purely nominal; "B" quality, unsalable.

* All prices for pitch are now quoted on the basis of f.o.b. In order to arrive at the f.a.s. value at any port it will be necessary to deduct the loading costs and the tolls whatever they may be.

Tar Products in Scotland.

GLASGOW, *April* 13.

While values continue rather unstable there is a better feeling prevailing nevertheless and new business is more plentiful.

Crude gas-works tar.—Actual value remains at 29s. to 31s. per ton *ex* works in bulk.

Pitch remains very quiet at 40s. to 42s. per ton f.o.b. Glasgow for export and 40s. per ton *ex* works in bulk for home trade.

Refined tar is commanding much attention at 3d. to 3⅛d. per gallon naked at makers' works.

Creosote oil.—Producers are well sold on contract and prices are firm. B.E.S.A. Specification, 4⅝d. to 5⅛d. per gallon; low gravity, 4⅞d. to 5⅛d. per gallon; and neutral oil, 4¾d. to 5d. per gallon; all f.o.r. in bulk.

Cresylic acid.—There is more movement, but prices are unchanged meantime. Pale, 97/99%, 1s. 3d. to 1s. 4d. per gallon; dark, 97/99%, 1s. 1d. to 1s. 2d. per gallon; and pale, 99/100%, 1s. 4d. to 1s. 5d. per gallon; all *ex* works.

Crude naphtha continues to command 4½d. to 4¾d. per gallon, according to quality and district.

Solvent naphtha.—90/160 grade is now quoted at 1s. 3½d. to 1s. 4½d. per gallon, but 90/190 heavy is unchanged meantime at 10d. to 11d. per gallon.

Motor benzole is decidedly dull at 1s. 2½d. to 1s. 3½d. per gallon in bulk *ex* works.

Pyridines.—90/160 grade is 5s. 6d. to 6s. per gallon, and 90/140 grade 6s. to 6s. 6d. per gallon.

Benzole Prices.

These are considered to be the market prices for benzole at the present time:

	s. d.		s. d.	
Crude benzole . . .	0 8½	to	0 9	per gallon at works
Motor ,, . . .	1 2	,,	1 2½	,, ,, ,,
90% ,, . . .	1 3	,,	1 3½	,, ,, ,,
Pure ,, . . .	1 6½	,,	1 7	,, ,, ,,

Contracts Advertised To-Day

Coal.

Llandudno Urban District Council. [p. 166.]

Retort Repairs.

Burton-upon-Trent Corporation. [p. 166.]

Trade Notes

A Works Acquisition.

The Nottingham Factory of Metropolitan-Cammell Carriage and Wagon Company, covering about 13 acres, has been acquired by Thos. W. Ward, Ltd., of Sheffield. It is not known whether this will be dismantled, but it is hoped some industry will take over the buildings, which would be very suitable for foreign manufacturers desiring to start works in this country.

A Useful Gas Fire-Guard.

A useful gas fire-guard for nurseries or other situations where clothing might be liable to come into contact with the flame is produced by Messrs. Procter Bros. (Wireworks), Ltd., of 12, Whitehall Road, Leeds. This guard is called the "Cairn" and is specially designed with a very large mesh so as not to interrupt the heat from the fire. Supplied in three colours—blue, buff, and green—this guard takes up very little room, being only 14 in. high and 17 or 19 in. wide as desired.

De Lavaud and Mairy Spun Pipe Patents.

The Stanton Ironworks Company, Ltd., exclusive licensees under the De Lavaud patents, have sub-licensed Cochranes (Middlesbro') Foundry, Ltd., to manufacture their centrifugal pipes under these De Lavaud patents for five years commencing 1935. In view of this, the International de Lavaud Manufacturing Corporation have withdrawn their threat of action against the Cochrane Company. The Cochrane Company are exclusive licensees in this country under the Mairy patents, and have sub-licensed the Stanton Company to use this process in conjunction with the De Lavaud system. The Stanton and Cochrane Companies will therefore be making similar pipes under both the De Lavaud and Mairy patents.

A Comprehensive Catalogue.

The new catalogue (No. 705) just published by Messrs. Falk, Stadelmann, & Co., Ltd., of Farringdon Road, E.C. 1, is of a very comprehensive nature, covering the firm's latest types of gas cookers, boiling rings, hotplates, wash boilers, and many other useful accessories. Among the smaller appliances, the "Two Side" toaster should make a ready appeal. It is a neat and effective "gadget" for standing in front of a gas fire, whereby the bread, standing upright at right-angles to the radiants, is toasted by the reflected heat from the two reflectors of the appliance. The double gas poker, also illustrated in this catalogue, will be found very useful for igniting large coke fires, while the "Hotspot" soldering iron is also a new line which is worthy of note.

Overseas Opportunities

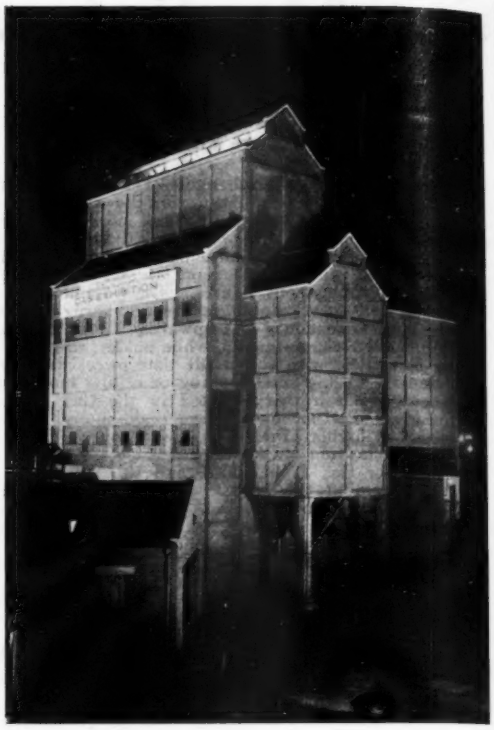
Wellington (New Zealand).

H.M. Trade Commissioner at Wellington reports that the New Zealand Post and Telegraph Department is calling for tenders, to be presented in Wellington by June 11, 1935, for the supply of three miles of solid-drawn or lap-welded steel pipes 8 in. diameter. (Ref. G.Y. 10,526.)

GLOVER-WEST VERTICAL RETORTS TO-DAY

At the present time the total of installations of Glover-West vertical retorts erected by this Company in Great Britain and Ireland stands at 246, and the total nominal daily gasmaking capacity of these reaches 342 million cubic feet. In the British Dominions 42 plants have been installed, their total nominal daily capacity being 69½ million cubic feet. In European countries there are 46 plants with a total nominal daily capacity of 62½ million cubic feet, and in other parts of the world, 30 plants with a total nominal daily capacity of 50 million cubic feet. The total of plants in service or in hand throughout the world is 375, and the corresponding total daily gasmaking capacity 535 million cubic feet.

Orders for installations of Glover-West vertical retorts have been received during the present year from the gas undertakings of Kilsyth and Montrose in Scotland, Buxton, Slough, and Svendburg (Denmark). Plants at East Hull, Yeadon, and Bilston are amongst those recently put into service.



WEST'S GAS IMPROVEMENT CO., LTD.

MILES PLATTING, MANCHESTER, 10. Telephone: Collyhurst 2981. Telegrams: "Stoker, Manchester."

LONDON: Regent House, Kingsway, W.C. 2. *Telephone:* HOLBORN 4108.

Glover-West Vertical Retorts.

•

Westvertical Carbonizing Chambers.

•

All Types of Mechanical Fuel-handling Equipment.

•

Above and below are two views of the complete installation of Glover-West retorts with coal and coke handling units, erected at the works of the Stirling Gas Light Company, Scotland, in 1931. There are 16 retorts in this plant, with a nominal daily gasmaking capacity of 1,440,000 cubic feet.

STOCK AND SHARE LIST

Official Quotations on the London and Provincial Stock Exchanges

Issue. £	Share	When ex-Dividend.	Dividends. Prev. Hf. Yr. % p.a.	Dividends. Last Hf. Yr. % p.a.	NAME.	Quotations, April 12.	Rise or Fall on Week.	Transactions, Lowest and Highest Prices During the Week.
1,551,868	Stk.	Mar. 11	7	7	Alliance & Dublin Ord. ...	125—135	...	131½
374,000	,,	Dec. 17	4	4	Do. 4 p.c. Deb. ...	90—100	...	...
557,655	,,	Feb. 18	7	7	Barnet Ord. 7 p.c.	165—170	...	166—169
300,000	1	Apl. 8	1/4½	1.9⅔	Bombay, Ltd.	28 6—30 6*	—/6	...
178,480	Stk.	Feb. 18	9½	9½	Bournemouth sliding scale ...	220—230	...	224
550,050	,,	,,	7	7	Do. 7 p.c. max. ...	167—172	...	167¾—169½
439,160	,,	,,	6	6	Do. 6 p.c. Pref. ...	147—152	...	...
50,000	,,	Dec. 17	3	3	Do. 3 p.c. Deb. ...	86—91	...	...
262,025	,,	,,	4	4	Do. 4 p.c. Deb. ...	104—109	...	105
335,000	,,	,,	5	5	Do. 5 p.c. Deb. ...	125—130	...	...
357,900	,,	Feb. 18	7½	7½	Brighton, &c., 6 p.c. Con. ...	170—175	...	...
649,955	,,	,,	6½	6½	Do. 5 p.c. Con. ...	153—158	...	154½—158
205,500	,,	,,	6	6	Do. 6 p.c. B. Pref.	145—150	...	146
1,487,500	,,	Feb. 4	5	5	Bristol, 5 p.c. max.	118—120*a*	...	...
120,420	,,	Dec. 17	4	4	Do. 1st 4 p.c. Deb. ...	102—104*a*	...	...
217,870	,,	,,	4	4	Do. 2nd 4 p.c. Deb. ...	102—104*a*	...	...
328,790	,,	,,	5	5	Do. 5 p.c. Deb.	122—124*a*	...	...
855,000	,,	Mar. 11	7	8	British Ord.	150—160	—2½	156½
100,000	,,	Dec. 17	7	7	Do. 7 p.c. Pref.	160—165	...	...
350,000	,,	,,	5	5½	Do. 5½ p.c. "B" Cum. Pref.	114—119	...	...
120,000	,,	,,	4	4	Do. 4 p.c. Red. Deb. ...	97—102	...	...
450,000	,,	,,	5	5	Do. 5 p.c. Red. Deb. ...	111—116	...	...
100,000	10	22 May '33	6	4	Cape Town, Ltd.	1—3	...	...
100,000	10	6 Nov.'33	4½	4½	Do. 4½ p.c. Pref. ...	1—3	...	...
150,000	Stk.	Dec. 17	4½	4½	Do. 4½ p.c. Deb. ...	88—93	...	89—90½
626,860	,,	Jan. 21	6	6	Cardiff Con. Ord.	130—135	...	...
237,860	,,	Dec. 17	5	5	Do. 5 p.c. Red. Deb.	105—110	...	...
157,150	,,	Feb. 4	5	6½	Chester 5 p.c. Ord.	111—116*b*	...	...
98,936	1	Mar. 25	2/-	2/-	Colombo, Ltd., Ord.	1⅝—1⅞	...	...
24,500	1	,,	1/4½	1/4½	Do. 7 p.c. Pref. ...	20/6—22/6	...	...
609,204	1	Mar. 25	-/11·48	-/11·48	Colonial Gas Assn. Ltd. Ord.	20/—22/-	...	21/4½
296,053	1	,,	1/3·30	1/3·30	Do. 8 p.c. Pref.	24/6—26/6	...	25/—26/3
1,775,005	Stk	Feb. 4	5	6	Commercial Ord.	114—119	...	...
475,000	,,	Dec. 3	3	3	Do. 3 p.c. Deb. ...	83—88	...	85
286,344	,,	Feb. 18	5	5	Do. 5 p.c. Deb. ...	123—128	...	...
807,560	,,	Feb. 18	7	7	Croydon sliding scale... ...	155—160	...	157½
569,590	,,	,,	5	5	Do. max. div.	112—117	...	...
620,385	,,	Dec. 17	5	5	Do. 5 p.c. Deb.	125—130	...	126—127
542,270	,,	Feb. 18	7	10	Derby Con.	185—195*c*	...	...
55,000	,,	Dec. 17	4	4	Do. 4 p.c. Deb.	100—105*c*	...	...
239,000	,,	Feb. 4	5	5	East Hull Ord. 5 p.c.	111—116	...	...
181,625	,,	Feb. 4	6	6	East Surrey Ord 5 p.c. ...	131—136	...	...
175,609	,,	Dec. 17	5	5	Do. 5 p.c. Deb. ...	120—125	...	...
1,002,180	,,	Mar. 11	†	†7	European, Ltd.	111—116	...	...
19,313,481	,,	Feb. 4	5½	5½	Gas Light & Coke 4 p.c. Ord.	25/9—26/9*f*	+/9	25/—26/7½
2,600,000	,,	,,	3½	3½	Do. 3½ p.c. max.	85—90	...	87—88½
4,477,106	,,	,,	4	4	Do. 4 p.c. Con. Pref. ...	104—109	...	105½—107
6,102,497	,,	Dec. 3	3	3	Do. 3 p.c. Con. Deb. ...	87—92	...	89½—90¾
3,642,770	,,	,,	5	5	Do. 5 p.c. Red. Deb. ...	115—120	...	...
3,500,000	,,	,,	4½	4½	Do. 4½ p.c. Red. Deb. ...	111—116	...	113—114
270,466	,,	Feb. 18	6	6	Harrogate New Cons. ...	135—140	...	...
140,000	1	Mar. 25	1/7½	1/7½	Hongkong & China, Ltd. ...	1¼—1½	...	...
213,200	Stk.	Feb. 18	6	6	Hornsey Con. 3½ p.c.... ...	128—138	...	...
5,600,000	,,	Oct. 22	14	10	Imperial Continental Cap. ...	202—212	+2	206½—210
223,130	,,	Jan. 21	3½	3½	Do. 3½ p.c. Red. Debs.	91—96	...	...
285,242	,,	Feb. 18	8½	8½	Lea Bridge 5 p.c. Ord. ...	172—182	...	...
2,167,410	,,	Feb. 18	6	6	Liverpool 5 p.c. Ord.... ...	134—138*b*	...	...
245,500	,,	Dec. 17	5	5	Do. 5 p.c. Red. Pref. ...	105—110*b*	...	...
306,083	,,	Jan. 16	4	4	Do. 4 p.c. Deb.	104—107*b*	...	...
165,736	,,	Feb. 18	8	10	Maidstone 5 p.c. Cap. ...	185—195	...	...
63,480	,,	Dec. 17	3	3	Do. 3 p.c. Deb. ...	83—88	...	...
75,000	,,	Dec. 3	†10	†10	Malta & Mediterranean ...	205—215	...	...
392,000	—	Apl. 1	5½	5½	Metropolitan (of Melbourne) 5½ p.c. Red. Deb.	100—105	...	...
231,978	Stk.	Feb. 4	5	5	M. S. Utility "C" Cons. ...	110—115	...	...
818,657	,,	,,	4	4	Do. 4 p.c. Cons. Pref.	102—107	...	105½
360,075	,,	Dec. 17	4	4	Do. 4 p.c. Deb. ...	102—107	...	104½—105½
148,955	,,	,,	5	†5	Do. 5 p.c. Deb. ...	125—130	...	...
125,000	—	Jan. 2	11/8	3½	Do. 3½ p.c. Rd. Rg. Bds.	98—101	...	...
675,000	,,	May 28	†6	†3	Montevideo, Ltd.	50—60	...	...
2,061,315	,,	Feb. 18	5	5⅔	Newcastle & Gateshead Con.	24/3—25/3*df*	...	...
682,856	,,	,,	4	4	Do. 4 p.c. Pref. ...	106—107*d*	...	...
776,706	,,	Dec. 17	3½	3½	Do. 3½ p.c. Deb. ...	101½—102½*d*	...	...
277,285	,,	Oct. 8	5	5	Do. 5 p.c. Deb. '43 ...	105—107*d*	...	...
274,000	,,	Feb. 4	5	5	Newport (Mon.) 5 p.c. max....	108—110*a*	...	...
225,000	,,	Feb. 18	7½	7½	North Middlesex 6 p.c. Con.	170—175	...	...
396,160	,,	Feb. 4	5	5	Northampton 5 p.c. max. ...	105—110	...	...
300,000	,,	Nov. 5	†7	†9	Oriental, Ltd.	170—175	...	170½—172
416,617	,,	Dec. 17	8	8	Plym'th & Stonehouse 5 p.c.	168—173	...	...
504,416	,,	Feb. 4	8	8½	Portsm'th Con. Stk. 4 p.c. Std.	173—178	...	175
241,446	,,	,,	5	5	Do. 5 p.c. max. ...	110—115	...	...
114,000	,,	Jan. 21	5	5	Preston 5 p.c. Pref.	108—113	...	...
1,736,968	Stk.	Feb. 18	6	6	Sheffield Cons.	141—143*e*	+1	...
95,000	,,	Jan. 7	4	4	Do. 4 p.c. Deb.	103—106*e*	...	...
133,201	,,	Feb. 18	8½	5	Shrewsbury 5 p.c. Ord. ...	142—147	...	...
90,000	10	May 28	†4	†3	South African	3—4	...	...
1,061,779	1	Sept. 10	1/2½	1/2½	South East'n Gas Cn. Ld. Ord.	27/—29/-	...	...
845,016	1	Mar. 11	-/10½	-/10½	Do. 4½ p.c. Red. Cum. Pref.	22/—23/-	...	22/—22/4½
450,000	Stk.	Feb. 4	74/4	4	Do. 4 p.c. Red. Deb. ...	100—103	...	...
6,709,895	,,	Feb. 4	5	6½	South Met. Ord.	125—130	+5	124—128
1,135,812	,,	,,	6	6	Do. 6 p.c. Irred. Pf. ...	147—152	...	149½
850,000	,,	,,	4	4	Do. 4 p.c. Irred. Pf. ...	103—108	...	105—108
1,895,445	,,	Dec. 17	3	3	Do. 3 p.c. Deb. ...	86—91	...	87½—88½
1,000,000	,,	Jan. 7	5	5	Do. 5 p.c. Red. Deb....	113—118	...	...
209,820	,,	Feb. 18	8½	8½	South Shields Con.	174—176*d*	...	...
1,543,795	,,	Feb. 18	6	6	South Suburban Ord 5 p.c. ...	128—138	...	129½—130
512,825	,,	,,	5	5	Do. 5 p.c. Pref. ...	120—125	...	...
500,000	,,	,,	4	4	Do. 4 p.c. Pref. ...	102—107	...	103½
888,587	,,	Dec. 17	5	5	Do. 5 p.c. Deb. ...	124—129	...	...
250,000	,,	,,	4	4	Do. 4 p.c. Deb. ...	103—108	...	...
647,740	,,	Feb. 4	5	5	Southampt'n Ord. 5 p.c. max.	114—119	...	...
121,275	,,	Dec. 17	4	4	Do. 4 p.c. Deb.	102—107	...	...
350,000	,,	Feb. 4	5½	5½	Swansea 5½ p.c. Red. Pref. ...	115—120	+2	116½—118½
200,000	,,	Dec. 17	6½	6½	Do. 6½ p.c. Red. Deb. ...	100—105	...	...
1,076,490	,,	Feb. 18	6½	6½	Tottenham and District Ord.	148—153	...	150—152
409,835	,,	,,	5½	5½	Do. 5½ p.c. Pref. ...	131—136	...	134½
62,235	,,	,,	5	5	Do. 5 p.c. Pref. ...	120—125	...	123
199,005	,,	Dec. 3	4	4	Do. 4 p.c. Deb. ...	103—108	...	...
369,774	,,	Feb. 4	7	7	Uxbridge, &c., 5 p.c.... ...	150—155	...	...
108,330	,,	,,	5	5	Do. 5 p.c. Pref. ...	118—123	...	118
1,326,700	,,	Feb.	7	7	Wandsworth Consolidated ...	152—157	...	152—156
1,371,373	,,	,,	5	5	Do. 5 p.c. Pref. ...	121—126	...	...
1,317,964	,,	Dec. 17	5	5	Do. 5 p.c. Deb. ...	126—131	...	128¾
208,300	,,	,,	26/8	4	Do. 4 p.c. Deb. ...	104—109	...	...
158,400	,,	Feb. 18	5	6*g*	Winchester W. & G. 5 p.c. Con.	116—121	...	...

Quotations at :—*a.*—Bristol. *b.*—Liverpool. *c.*—Nottingham. *d.*—Newcastle. *e.*—Sheffield. *f.*—The quotation is per £1 of Stock. *g.*—Paid £3, including 10s. on account of back dividends. * Ex. div. † Paid free of income-tax. ‡ For year.

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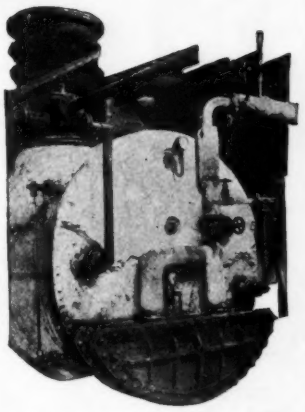
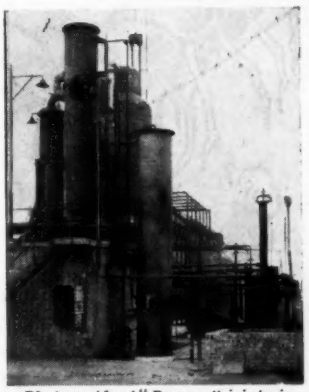


Front view of a Benzole Rectification Still. All joints are made with "Permac."



Photograph of "Permac" joints in an important London Gas Works.

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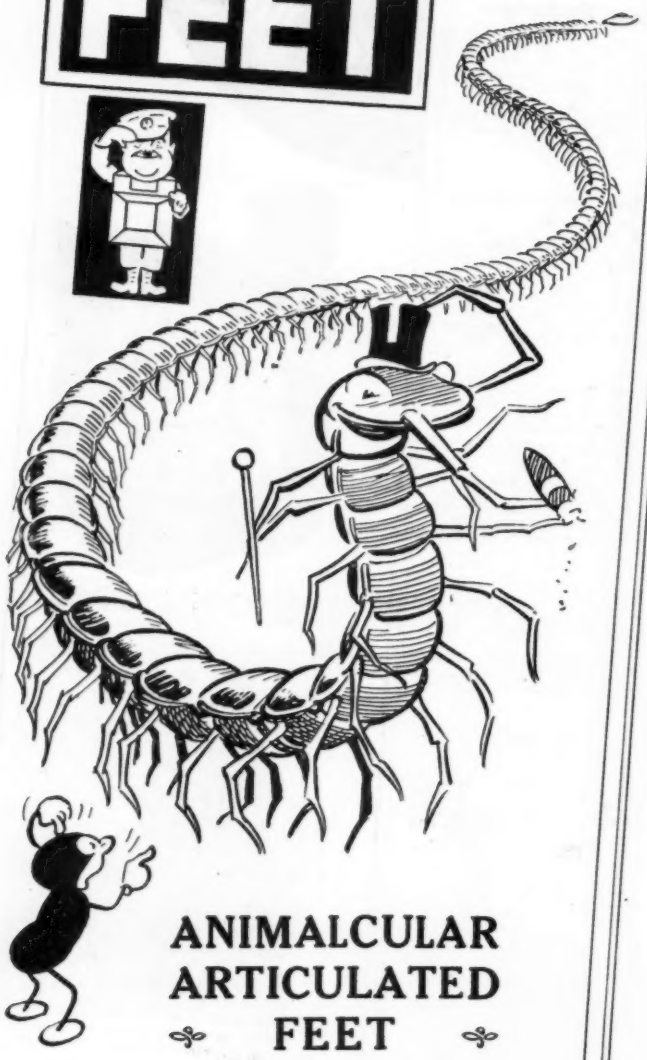

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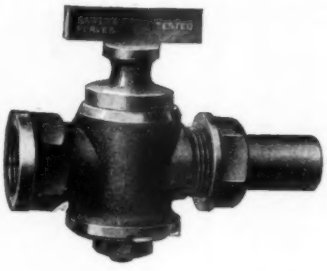

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